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Citrus Fruits, Diseases & Pests

Some New or Little Known Citrus Diseases Observed During the Past Year

By Dr. Arthur S. Rhoads, Associate Plant Pathologist, Cocoa Laboratory of Florida Agricultural Experiment Station. Presented at the Forty-third Annual Meeting of the Florida State Horticultural Society at Sebring, April 8 - 10, 1930.

The following paper is a presentation of a number of new or little known citrus diseases that have come to the speaker's attention during the past year. The presentation of these troubles is made for a two-fold purpose: first, to record observation on certain citrus diseases which have not been reported heretofore and, second, to assure the citrus growers that the workers of their State Experiment Station are earnestly endeavoring to be of service to them in the solution of their problems. It is hoped that this presentation of the available data on these new or little known diseases will direct the attention of growers and investigators to these problems and stimulate greater interest in making observations which may contribute to their solution at some future period.

Devitalization of trees on Lemon Rootstock

A characteristic decline of citrus trees, which does not seem to have been reported heretofore, has become especially prevalnt in the central part of the peninsula during the past three years. This trouble appears to be confined to trees on lemon rootstock, including the rough lemon and the everbearing lemon which has been promiscuously mixed with this stock in many cases. It occurs in groves on soils of good drainage and depth and on trees that were previously in a good state of health and productivity. This trouble occurs most frequently on grapefruit and orange trees that have attained an age of from 12-15 or more years and have reached the point of developing large crops of fruit, but occurs occasionally on younger trees.

Dr. Arthur S. Rhoads

Although this form of citrus tree decline has been observed to occur with more or less frequency for several years, it became especially prevalent during 1928 and 1929. Many growers allude to it by the term "blight", unfortunately choosing a term which already covers a group of entirely different forms of tree decline. As in the case of trees affected by typical "blight", however, the growers do not seem to be able to restore to productive condition trees affected by the trouble in question. It would be particularly desirable to have an appropriate name for this trouble which would be both brief and expressive.

The present widespread occurrence of this trouble in the groves of the central portion of the peninsula apparently dates from late July or early August in 1928, following the gener-

al drought during the first five months of that year and the hurricane of September. This decline appears to develop characteristically on trees that were heavily loaded with fruit. In many cases, practically all the older trees throughout portions of groves, in so far as they were heavily loaded with fruit, developed a pallid condition of the foliage and began to lose leaves. This was soon followed by the dying of numerous twigs and, later, branches. Despite the fact that the summer rains of 1928 were fairly heavy and even excessive in some sections, the trees became worse steadily. Following the hurricane which swept across the state in September, many of the trees were left with more fruit than leaves. In many cases the trees, despite their greatly devitalized condition, were allowed to carry their large crops of fruit unusually late in the season. By the spring of 1929, large numbers of trees that were fine looking trees a year or so previously were in a deplorable condition and many of them had declined to such a point that they were worthless.

Although the chlorotic condition of a large part of the foliage associated with crop strain, in itself, is not regarded as a serious matter, large numbers of trees so affected have lapsed into a characteristic type of decline and continue to die despite special efforts upon the part of the growers to save them. In the flush of growth developed following the initial stage of the decline the foliage is characterized by being abnormally small and by having a dull, dingy, hard appearance like the foliage on declining parts of "blighted" trees. On the growth developed following this unmistakable symptom of tree decline the leaves become even smaller and conspicuously frenched at the ends of the branches. The more seriously affected twigs and branches die back rapidly. Frequently, however, they become defoliated but remain green for a time.The more vigorous of such twigs on seriously affected trees commonly exhibit extensive multiple bud formation as in the case of exanthema (dieback). Trees that have lapsed into a general decline often bloom heavily shortly after the regular blooming period and may bloom sporadically during the summer—even up to late September. In this respect, the trees behave like the so-called "blighted" trees or certain types of water-injured trees although their mode of decline is quite different. The scanty amount of fruit set on declining trees is abnormally small and frequently below commercial size. In addition, the fruit often exhibits an abnormal lumpy rind condition and, occasionally, a pronounced pitted condition.

After the top of the tree has declined somewhat a more or less vigorous growth of shoots often devolops in the lower part of the crown, the size and vigor of this growth contrasting strongly with the devitalized appearance of the balance of the crown. Trees that have been headed back heavily frequently put out a good growth for a time but continue to decline later (fig. 1). After the tops of affected trees have declined extensively a more or less abundant development of waterspouts occurs from the main limbs at the base of the crown, as in "blighted" trees. No pronounced wilted condition of the foliage is evident, however, as invariably occurs in the case of the so-called "blighted" trees.

Affected trees decline fairly rapidly, even without the influence of hurricanes, and dead twigs and branches may show up abundantly within a period of a year. The trees usually decline to such an extent in from 1-3 years that they are worthless commercially. Trees affected by this decline often die out in spots through the grove, one or more trees developing the trouble after one has declined from it, or large areas of trees may develop the trouble simultaneously. This has suggested to some growers that the trouble is contagious. However, in most cases, the disease occurs more or less sporadically throughout the grove with no particular system.

The roots of the trees developing this form of decline invariably show more or less dying and subsequent decay. The decline of the root system seems to be of rather general nature, apparently starting at the ends of the roots and progressing toward the root-crown. The dying back of the roots may be observed on the divisions of the taproot as well as on the lateral roots. All gradations from the death of small divisions of the roots to cases where lateral roots are dead back to the root-crown may be found. In addition, the roots remaining alive frequently exhibit a dearth of fibrous roots and the

Fig. 1.—Decline of grapefruit tree on rough lemon stock. This started 3 years ago, following a heavy crop.

few that are present may be dead. In the cases that have been studied, the decline of the root system exhibits no evidence of having been caused by an organism. The decline of the root system is quite obviously responsible for the decline observed in the tops of the trees. In trees that have declined extensively a large proportion of the root system is found to be dead.

Although there has been no opportunity to make a detailed study of this alarming and widespread form of tree decline, or to correlate the conditions in detail which were associated with its occurrence, the principal cause seems to be the production of excessive crops in conjunction with prolonged periods of drought, defoliation and other injury from storms, holding the fruit late in the season on weakened trees, curtailed fertilization, and other devitalizing influences.

During the protracted drought of

Fig. 2.—Bark rot lesion at base of orange tree, showing discoloration of wood after removal of diseased bark.

the first half of 1928 the affected trees, especially the grapefruit, were carrying large crops of fruit. In fact, counting the spring and June bloom crop, trees in some instances had borne five crops of fruit during the past three years. In some localities the excessive rains of the fall of 1928 unquestionably leached out of the soil a large amount of the soluble fertilizer materials. With the resumption of rainfall following the prolonged drought of the first five months of the year the trees with heavy crops of fruit were confronted with the difficult task of maturing a large crop of fruit despite their greatly weakened condition. The fruit was thus matured at the expense of the trees. Trees that were carrying little or no fruit exhibited little or no injury. Numerous observations indicate a correlation between the occurrence of this injury and the size of the crop of fruit borne by the trees in 1928 and 1929. Many instances were noted where the top of a tree, the lower part or one side that happened to have a large crop of fruit declined while the balance of the tree, on which but a small amount of fruit was borne, did not exhibit the trouble to any marked extent at the time. A comparison of the Marsh grapefruit with the Florida Common and of the Valencia orange with the Pineapple and other mid-season varieties of oranges clearly demonstrated that the more or less seedless varieties of both grapefruit and oranges, which are characterized by a consistent habit of bearing, were much less disposed to develop the decline than were the seedy varieties, which are prone to develop heavy crops of fruit. Groves that were adequately supplied with moisture by irrigation during the protracted drought of 1928 suffered none of the ill effects described and set good crops of fruit in 1929.

Bark Rot

An unusual bark disease was observed attacking orange trees on rough lemon stock in a grove near Eloise in Polk County in December, 1929. The disease had attacked about 20 large trees approximately 20 years of age. Most of the attacked trees were confined to 4 rows of trees thought to be an inferior strain of Pineapple orange. The disease appeared much like foot rot but started at or above the bud union and extended upward from 2-3 feet, rapidly spreading around the trunks. In only one instance was the disease observed to extend downward onto the roots. At the time of the discovery of this disease, some of the trees were from half to two-thirds girdled. Since none of the attacked trees exhibited any evidence of decline of the tops, it is evident that the disease was of recent development.

The disease was characterized by the discoloration and death of the bark which developed a series of fine season checks in drying out. This manifestation was accompanied by a very scanty exudation of gum from the margins of the bark lesions. The diseased condition of the bark was so inconspicuous that it could very readily have been overlooked by a mere casual observer until the trees

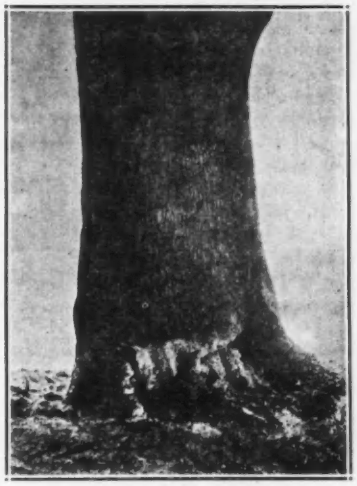

Fig. 3.—Basal lesion on grapefruit tree attacked by Clitocybe mushroom root rot.

became half or more girdled. The dead bark near the bases of the trees soon became invaded by flat-headed borers and was further characterized by a sour, ill-smelling odor and by the development of whitish masses of Fusarium spores in some cases. Upon cutting out the diseased bark down to the wood, the surface of the underlying wood was found to have a characteristic dark discoloration (fig. 2).

The diseased trees were treated by cutting out all diseased bark slightly in advance of the discoloration, painting the scraped wood surface with lime-sulphur solution and subsequently applying a durable waterproof wound dressing. An attempt was made to isolate the casual organism from some of these trees before they were all treated. Fifty-one tubes of maltonse agar were inoculated in the field with bits of the inner bark, taking careful aseptic precautions. Of these, 10 were from a tree with a small, newly developed bark lesion, 10 from very dark island-like patches of inner bark in a well-advanced case of the disease, and the remaining 31 from the discolored marginal bark of a well-advanced case of the disease. Of the first 10, 6 tubes developed Phomopsis citri; of the second 10, 7 developed a Fusarium apparently identical with that obtained in cultures from the masses of Fusarium spores on the dead bark in some cases; and of the 31 tubes inoculated from the third tree, 2 developed

Phomopsis citri. The balance of the tubes, with the exception of 2 that developed small bacterial colonies, remained sterile. The possibility of Fusarium being the cause of this bark disease will have to be determined by inoculation experiments.

What appeared to be the same disease was observed on grapefruit trees on rough lemon stock at Georgiana, Merritt Island, in March, 1930. Of the 4 trees first observed, one had died recently, while 3 others nearby were more or less completely girdled, with the tops fully half dead, blooming profusely, and the foliage exhibiting acute nitrogen starvation. The worst one of these died within a period of a month. Two other declining trees were subsequently noted which exhibited an old foot-rot-like lesion at one side of the base. Each of these 6 trees, however, exhibited a considerable proportion of dead roots with rotted bark, in which respect they differed from the diseased trees observed at Eloise.

Fig. 4.—Severe case of gummosis on 3 year old grapefruit tree, apparently due to deranged growth stimulus.

It is believed that continued study of the trunk and root diseases will enable us to segregate a number of closely related troubles from those that have been construed as foot rot in the past.

Clitocybe Mushroom Root Rot

Numerous cases of mushroom root rot have been recorded on a variety of woody plants from various parts of Florida during the past 5 years but it was not until December, 1929 that definite evidence was secured that citrus trees are also attacked by this root rot fungus. At this time, specimens of the diseased roots, sent from Lake Alfred for identification, led to a visit to the grove to secure first hand information in regard to the occurrence of the trouble.

The case of mushroom root rot in question was on grapefruit trees, about 15 years of age, on rough lemon stock. During the approximately 1-year-period that the present owners have had the grove they noted that an occasional tree had died out on an area of about half an acre. Their attention was first called to foot rot at the root-crown but, recently, in investigating the root systems of a number of trees in more detail, the tap-roots and many of the lateral roots were found to be dead, even on trees which did not show any root-rot lesion at the base of the trunk (fig. 3) or any particular decline of the tops. When the trees were visited in January, several old detached clusters of the mushrooms of the causal fungus (Clitocybe tebescens) were still in evidence under some of the trees. Many of the more recently attacked roots that were examined exhibited the characteristic vegetative development of this particular mushroom root rot fungus. This consists of whitish to cream-colored wefts of mycelium, often with a fan-shaped marginal development, between the bark and the wood and also growing through the tissues of the inner bark. The clusters of mushrooms or toadstools are developed from the root-crowns and roots of the attacked trees after the fungus has attained sufficient development to fruit. The season of their appearance in Florida usually is during the months of October to December. Most of the attacked trees in the infected area of the grove exhibited but little or no decline of the tops but it is only a matter of time until these trees die out unless they can be treated so as to check the development of the disease.

The organism causing this root rot is one of the gill fungi, popularly termed mushrooms or toadstools, which develop in clusters comprising several individuals. It is propagated both by means of the myriads of spores developed on the gills of the fruiting bodies and by means of brownish strands or rhizomorphs which are developed under certain conditions. The latter develop readily in artificial cultures of the fungus and furnish one of the chief means of identifying the organism before the mushroom-like fruiting bodies are developed. By means of these structures and other vegetative parts, the fungus can spread underground to other roots or trees and attack them. The fungus can live as a saprophyte in old stumps and roots of various hardwood trees, being of especially frequent occurrence in sections where oak trees abound. When the fungus has attacked the root-crown or roots of the tree sufficiently to cut off the water supply the foliage turns yellow and eventually wilts and dries up and the tree, or sometimes merely a part of the tree, dies suddenly. In some states Clitocybe root rot occurs with especial frequency in orchards or vineyards on compact, poorly drained soils. In Florida, however, practically all the cases observed have been on well-drained sandy soils.

The finding of this long-standing case of mushroom root rot on citrus trees demonstrates that this trouble undoubtedly has occurred on citrus trees in Florida for a number of years but that it has been confused with foot rot.

In order to be effective, control measures must be applied before the disease has progressed to such an extent as to kill a large percentage of the roots or to girdle the root-crown since, after the disease has progressed to this extent, the death of the tree is inevitable. Unfortunately, this extent of the development of the trouble usually is required before the symptoms of decline develop in the top of the attacked tree to warn the casual observer that something is wrong with the tree.

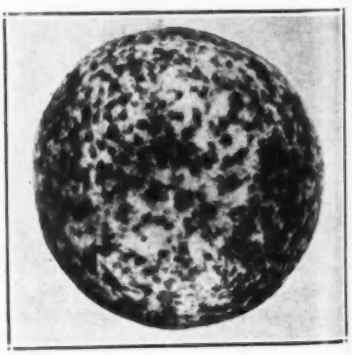

Fig. 5.—Grapefruit blotch.

The extent to which the disease has attacked the root system can be determined only by removing the soil sufficiently about the root-crown and adjacent roots. If it is practicable to treat the tree, all dead roots should then be cut out back to the root-crown and any root rot lesions that

may occur on the root-crown or base of the trunk should have the diseased bark cut out back to healthy bark and cleaned off down to the wood. All exposed wood surfaces should be painted with a durable waterproof wound dressing.

Probably the best method for the control of the mushroom root rot fungus is to use the "aeration method" in conjunction with the above sanitation measures. This simply consists in leaving the crown roots exposed to the air and sun until the following winter, when they may again be covered with soil if danger from cold is feared. Considerable experimental work has been done in attempting to control similar root rot fungi by various chemical treatments of the soil, especially in European countries, but without sufficiently consistent success as to justify any recommendations.

Forms of Gummosis not Initiated by Organisms

An unusual type of gummosis was observed at Vero Beach in February, 1930. This consisted of a severe outbreak of the disease on a large number of vigorously growing and heavily fertilized grapefruit trees that had been set out on low hammock land but 3 years. The disease had broken out at numerous points on the trunks, branches and even on the twigs. It was evident that in this case no organism was responsible for initiating the trouble but rather some excessively strong physiological stimulus which resulted in the formation of a large amount of gum instead of normal wood elements by the growing tissues. This plethora of gum accumulated under the bark resulted in its rupture at numerous points, which allowed the gum to exude (fig. 4). The trouble resulted in the sudden death of the ends of branches on occasional trees.

The effect of various chemicals in stimulating gum formation in citrus trees is well known. The injurious action of bluestone through indiscreet use of it was very strikingly portrayed in one grove at Lucerne Park where a large number of trees had been treated by inserting crystals of bluestone under the bark at 4 points at the base of each tree. Streaks of bark were killed with great regularity above the points where the bluestone was inserted and the exudation of gum, closely approximating typical gummosis in some cases, was a conspicuous feature of the majority of the trees treated.

Grapefruit Blotch

An unusual type of fruit blotch, heretofore unreported, was observed in January, 1930, in a number of groves about 9 years of age on rough lemon stock in the vicinity of Auburndale. The trouble was confined to grapefruit (mostly Marsh Seedless with some Silver Cluster) and develops in midwinter as a series of pronounced greenish blotches which later become dark brown. The blotches are mostly irregular to more or less circular in shape and average about 3-16 inch in diameter. They closely resemble the greasy spot or so-called "greasy melanose" that has been of common occurrence on citrus foliage for many years. In severe cases, the blotches may be so densely crowded as to be more or less continuous over considerable areas of the fruit (fig. 5). They develop in greatest abundance on the lower sides and bottom of the fruit. The trouble occurs characteristically on the fruits in the interior of the tree, both in the center of the crown and near the ground, but rarely on the fruits that are borne on the outer part of the crown. It occurs more or less sporadically through the groves exhibiting the trouble, being of but slight occurrence on the fruits of some trees but of extensive occurrence on the fruits of others. In the worst cases observed, from 50 to 75 per cent of the fruit exhibited more or less of the blotchy appearance, much of the fruit being so badly blotched as to result in its culling in the packing house. The development of this fruit blotch appears to start about midwinter and progresses rapidly with the occurrence of warm weather. This trouble has occasioned more or less fruit loss and reduction of grade during the past 3 years. The blotches do not become sunken to any extent nor does the trouble seem to result in any breakdown or decay of the affected fruits.

Fig. 6.—Lumpy rind in grapefruit.

The trouble does not appear to be caused by any organism and attempts to isolate one from blotchy fruits were unsuccessful. It appeared rather to be a physiological disorder. However, despite careful field investigation, nothing in the way of tree condition, cultural practices, fertilization, or spraying could be consistently correlated with the occurrence of the trouble. Several of the trees that exhibited an abundance of the blotch exhibited an unusual development of the greasy spot on the foliage, even the terminal foliage. However, other trees were observed that had a considerable development of the fruit blotch but exhibited very little of the greasy spot on the foliage. The grapefruit trees in the groves that exhibited the fruit blotch were in fairly good condition but the fruit was rather poor in quality and exhibited a pronounced greenish cast. No evidence of the trouble on oranges or tangerines was observed in the groves where it was prevalent on grapefruit. The grapefruit trees in other groves in the vicinity, where the fruit was of much better quality and color, were free from the trouble.

Lumpy Rind

Lumpy rind is a characteristic, abnormal condition of the rind that occurs occasionally on grapefruit, and rarely on oranges. Outside of Florida, this trouble appears to have been reported only from Porto Rico. This abnormal fruit condition is characterized by the occurrence of from one to several, more or less prominent, hard lumpy places in the rind, usually on the side of the fruit. In severely affected fruits a large area of the rind on one side may be characterized by a very hard, thickened, and more or less lumpy condition. In such cases, the normal growth of the fruit seems to be retarded on the affected side and the rind is further characterized by the oil cells being abnormally small and closely crowded.

Upon cutting fruits affected by lumpy rind, there is found in the center of the considerably thickened rind at each hard, lumpy place a center of hard, brownish, abnormal tissue surrounded by a watery zone of tissue which, in turn, may be surrounded by normal rind. Where considerable areas of the rind are affected, the abnormal, hard brownish tissue in the rind will be found to be co-extensive (fig. 6). This abnormal tissue usually occupies a median position in the rind but may attain such an extensive development as to involve practically all of the white portion of the rind. Gum pockets occasionally occur at the centers of the

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Soil Conditions and Citrus Tree Responses

By E. L. Lord, at Meeting of Florida State Horticultural Society, Sebring, Florida

We know so little about the citrus tree that a discussion along the lines indicated by the title of my paper must almost be considered as reaching over into the realm of philosophy, rather than as a scientific dissertation on the subject. However, a little philosophy now and then might be advantageous to the citrus grower as a means of dissociating his mind from such subjects as the fruit fly, quarantines, processing, arsenical sprays and similar ideas incidental to citrus production.

Prof. E. L. Lord

Before taking up the subject of special responses of the citrus tree to particular soil conditions, I should like to call your attention to the very primitive way in which citrus trees were fed before man appeared on the scene. This will take some imagination, but I have an idea that observations as to the way in which tropical forest trees are fed may give us a clue. Imagine, if you can, what happens to a citrus seedling after it germinates in the rich deep organic soils of the rain forests of Southeastern Asia. This tree has to make all of its leaves, wood and roots from the materials found in the soil, with no help in the way of commercial fertilizers, cultivation, or any other aid from man. Given room and light in which to develop, it will do this, as the wild thickets of sour range in this area testify. It has also been able to develop and compete against other trees in the same way, under similar climatic conditions.

Under such conditions how does the citrus tree get the food materials necessary for its growth? If you examine the forest floor you will find coarse material, leaves and twigs on the surface, then finer materials below this, gradually merging into the underlying soil. As this organic matter decays it furnishes to the tree the materials needed, for its growth.

According to Waksman the soil organic matter is made up of three parts, one consisting of the undecomposed organic matter which has not been broken down into soil; a second part which has a high water holding capacity and is found in increasing amount in acid soils; and a third part which is colloidal in behavior and gives the buffer action to the soil. This third fraction which makes the soil more adaptable in its behavior is greater when the soil is more nearly neutral and is destroyed by high acidity, a reaction of pH4.6 causing its precipitation. It is important in this connection to notice that Hendricksen found that a soil reaction between pH4 and pH5 stopped the growth of citrus trees completely.

It is my belief that the citrus tree grows best in deep organic soils that are well drained. This idea is not a new one and I have called it to your attention before. Nichols in his Textbook of Tropical Agriculture makes the following comment, which is based on Eurasian and West Indian experiences:— "The orange tree will grow in almost any soil except a sandy one, provided there is good drainage. . . . . Good crops, however, can be expected only from rich land, for all of the members of the orange family love a 'generous soil'. Clays, loams, marls and caloareous soils are all suitable, and the larger the amount of humus the better the tree will thrive". Needless to say this was written thirty years ago, before the wide distribution of rough lemon stock. The heavy mass of organic matter gives the slow feeding necessary to the health of the orange tree and fruit. Adding sufficient nitrogen and water so that the tree can establish regular bearing habits, and sufficient phosphoric acid, potash and calcium to keep the organic matter in the right condition and you have the basis of productive citrus culture.

What happens when the water relations are disturbed so that the tree gets either too much or too little? Drouth stops growth and if prolonged will cause curling of the leaf, and if accentuated abscission of the leaf and fruit. A high water table drives out the air from the soil, destroying first the fine feeding roots, then, if prolonged, larger and larger roots. The foliage yellows, the older leaves drop off, and the tree has an open appearance similar to that caused by drouth. Where there is a very variable water table the alternate dessication and suffocation keep the foliage in this open condition. Heavy crops under such conditions are injurious and liable to kill the tree. Profitable citrus production under these conditions is difficult.

Before taking up the question of the behavior of the different nutrients let me call your attention to the fact that the presence of a certain nutrient in the soil solution does not insure that it gets into the tree. It appears that it is not only necessary to have water as a carrier of these nutrients, but the rate of absorption of these nutrients depends somewhat upon the presence or absence of other substances in the soil solution, as well as upon the hydrogen in concentration of the solution.

If it is assumed that in order to make the most new wood and leaves the top must be supplied with all of these nutrients in the right proportion, then it is apparent that the acidity is important, as there is much evidence to show that a change in acidity varies materially the proportion of the different nutrients absorbed.

Next to water, nitrogen is most often the limiting nutrient in citrus production. It is difficult to measure the nitrogen requirements of the citrus tree, as the question is much confused because of the effect of nitrogen from different sources. Brebeale has called attention to the fact that nitrogen from various sources, applied to citrus trees, varies as to toxic limits. Apparently the toxic limit is more quickly reached in the case of sulphate of ammonia than in the case of nitrate of soda or nitrate of calcium or urea. Higher amounts of nitrogen in all of these forms may be added if there is an adequate supply of calcium in the soil as Ca to a certain extent protects the citrus tree from damage. It is my opinion that with the use of certain sources of nitrogen adequate nitrogen feeding of the citrus tree is impossible, and with other sources it is difficult, especially on acid soils deficient in calcium.. Trees under supplied with nitrogen make little growth and the foliage is pale and scant. The fruit tends to be small, although it may mature earlier, if the nitrogen deficiency is not too great.

Nitrogen deficiency is usually more critical during the colder months, since nitrification is slowed down as the temperature is lowered. Heavy dropping of leaves, yellowed and scanty foliage, tend to be worse as temperatures decline. A heavy crop on the tree adds to the burden. At this time it is very important to see that the tree is kept well supplied with soluable nitrogen in forms which are of low toxicity.

During the warmer months, on soils well supplied with organic matter, sufficient nitrogen may be produced from the soil to supply much of the needs of the tree.

To sum up:— if sources of nitrogen which have a low toxicity are used, the color of the foliage and the rate of growth of "flushes" and fruit are a fair indication as to the nitrogen requirements of the tree; this is particularly true on soils well supplied with organic matter.

According to Takehashi, who has done a large amount of work on nutrient requirements of citrus trees, there is little added growth produced in the citrus tree, when the ratio of phosphorus to nitrogen is greater than 6|5, and this seems to be about the required amount. While a decrease of this ratio may result in lessened growth, there is no doubt that this situation is rare in Florida, where we usually add much more. The legumes and the tomato are good indicators of phosphoric acid deficiency, and it may be possible to find with some accuracy whether our soils contain sufficient amounts by watching their behavior in a grove. It is certainly true that we cannot restrict the growth of citrus trees by adding phosphoric acid to the soil greatly in excess of the needs of the tree and crop. It appears that the efficiency of the phosphorus in the soil is somewhat dependent on the form in which it is found. Since organic sources of phosphorus appear to be very efficient in stimulating the growth of citrus trees we should not lose the opportunity of changing inorganic phosphorus to organic phosphorus by the use of legumes. Incidentally, experimental work at the Rhode Island, Wisconsin and other stations shows conclusively that phosphorus is much less readily available to the plant in acid soils, and in consequence if a plant like citrus will succeed in neutral soils, as Hendricksen and Webber have shown, then keeping the soil as near neutral as possible will help to insure adequate absorption of this element. One indication of a phosphorus deficiency is found in the failure of sufficient fruit to set in the spring, when there is an adequate supply of water and nitrogen. An excessive amount of phosphorus without adequate nitrogen and potash tends to increase the decay of oranges.

The question of potash deficiency is also complicated by soil reaction. There is much evidence to show that marked increases in acidity make it difficult for the citrus tree to take up the potash which it requires for normal growth. The tendency of citrus trees receiving plenty of nitrogen to go into a dieback condition when the reaction approaches pH5.0 is perhaps related to this inability to absorb potash at that level. Takahashi and others working with citrus trees have shown both in sand and field cultures that when the ratio of nitrogen to potash varies from the 5|3 ratio in either direction there is a marked decrease in growth. A deficiency of potash in the tree is shown in coarse, uneven foliage, a decrease in fruit size, and deficiency of sugars and flavor in the fruit. An excess is shown in shortening and hardening of growth, a decrease in fruit size, and reduction in leaf size. If the correct amount is put on the soil, the soil must be approximately neutral for it to be absorbed to best advantage. It might be in point to call attention to the fact that most soils, with perhaps the exception of sandy siols have a high absorptive capacity for potash, so even on Norfolk soils the loss by leaching is only about 10% per year. Increasing the organic matter in the soil increases the holding capacity, and keeping the soil near neutral assists the tree in getting it.

Calcium is an important as the other mentioned elements in the economy of the citrus tree. Citrus trees suffering from calcium deficiency show a chlorotic condition commonly known as "frenching". As orange trees have a greater need for lime than grapefruit trees, they are much more liable to chlorosis. This lack of calcium may be produced in two ways; either by a lack in the soil itself (common in sandy soils), or by a soil condition which prevents calcium absorption. It is an interesting fact that neutral soils rich in calcium are usually very profitable citrus soils. However, when the reaction of calcareous soils gets markedly alkaline, the tree is unable to get the lime which it requires and becomes chlorotic. The addition of bulky organic matter, stopping of cultivation, and the avoidance of fertilizers which increase alkalinity will benefit frenching. Light applications of calcium nitrate will also help, as this fertilizer supplies the need for calcium without affecting the soil materially. In cases of lime deficiency as shown on sandy soils, the remedy is an increase of organic matter. On very acid soils, lime should be added. Much of the trouble caused by liming citrus trees has been brought about by heavy applications of finely ground limestone on sandy soils. If coarse granular limestone is applied to the more acid soils in moderate amounts, the effect is markedly beneficial. Wood ashes in moderate amounts are desirable, but usually too expensive. Under adequate calcium fertilization the orange tree will remove calcium from the soil faster than potassium, and most old groves show a grave calcium deficiency.

Turner calls attention to the tendency of tropical soils to increase rapidly in acidity, and shows how liming properly done greatly increases productivity. Alicante found a rapid lowering in citrus production as soils

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Feeding Citrus Trees

By Max Waldron, at Meeting of Florida State Horticultural Society

The matter of feeding citrus trees has within the past year become the most widely discussed question among growers, except that of the outbreak of the Mediterranean Fruit Fly. The reason for this wide discussion is the publication of results of citrus fertilizing experiments of the Lake Alfred Sub-Station. Unfortunately the problem is still far from being settled in the minds of the average grower and as a consequence there has perhaps never before been such a confusion of opinions upon what should be the well known and basic practices of citrus feeding. It should be one of the functions of the Florida Horticultural Society to present to the grower, particularly the novice, some constructive program of citrus feeding which has been known to give good results, so that upon leaving our sessions he can return to his labors with a definite aim in view. Too often the inexperienced grower has complained that when all the experts have had their say the recommended practices are so conflicting that he is at a loss which plan to follow. No doubt the reason for creating such a chaotic mental condition is that each advocate of some particular practice overemphasizes the phazes which appeal to him and neglects to stress other factors which may be the controlling ones.

Naturally with such a comprehensive subject as the "Feeding of Citrus Trees," I will not attempt to survey the practices in use over the many varied soil areas of the state. Instead I shall discuss only results of actual experience, over a period of fifteen years, on the Norfolk soil in the Ridge Section of Polk County.

This area in its native state has been swept by fires for so many years that when one clears and turns it preparatory to planting he finds it almost devoid of organic matter. The soil analyst reports 2.79% to be exact. This fact gives the chief clue to what appears to me to be the secret of proper citrus feeding on the sand hills, namely, the unceasing addition of organic matter to the soil, both by the growth of cover crops and the addition of organic fertilizers.

Recent laboratory determinations indicate that our sandy soils only slightly more than hold their own in organic content where the best of cover crops are grown. One can make no mistake in augmenting this source of organic material by the application of such very desirable organics as Peruvian guano or goat manure. We do not believe we can depend solely upon chemical fertilizers, such as nitrate of soda, to give us any real soil improvement for the benefit of the future needs of the tree.

One might well commence the feeding of a citrus tree some months before it is planted by growing a leguminous cover crop, preferably Crotalaria, during the summer prior to the planting season. Trees planted on land which has been turned for a year or more and allowed to grow a cover crop will almost invariably outrank those planted a year earlier on newly cleared land. This again proves the old adage that it is best to make haste slowly.

After the trees are planted, the annual leguminous cover crop is maintained, being mowed in August and plowed or disced in the early fall. Groves worked late in the fall suffer most from drought during dry winters. In this connection it occurs to me that the grounds for the quarrel between the advocates of plowing and those of discing are more imaginary than real. If plowing is properly done to a depth not to exceed four inches no more harm can come to the tree roots than is caused by the disc sinking to that depth, which is usually the case. At the time of planting the trees the addition of half a pound of Peruvian Guano per tree has proven to be more of a growth stimulant than the more widely used bone meal.

Once the grove is planted the grower should not deceive himself by attempting to make short cuts in his fertilizer requirements. In buying fertilizers, as in buying shoes, one gets exactly what he pays for and he should pay for the best. During the first five years of the life of a grove when tree growth is more vital than the amount or quality of fruit, the ammonia content of the spring and summer fertilizer formulas should be 4%, with the summer application consisting largely of organics. By the continued use of organic fertilizers and the growth of cover crops the splitting of Valencia oranges is materially reduced.

Upon arriving at the bearing age the fertilizer practices for a grove, particularly of Valencias, are considerably altered, altho the necessity for increasing the humus content of the soil is never lost sight of. Trees which have been liberally supplied with organics put on a profusion of foliage, indicating a healthy condition. Such a tree will bear heavily provided potash is generously used in the summer and fall fertilizer formulas. It has recently been ascertained by some painstaking scientist that it requires fifty leaves to produce one apple. No one knows how many leaves it takes to make one grapefruit but the ratio of number of leaves to fruit is no doubt somewhat comparable to the apple. At any rate, this information is an indication of the importance of securing an abundance of foliage to produce and sustain a large crop, tho the foliage must of course be of the fruit bud type rather than of the rankly vegetative type. A thoro discussion of the contributing factors in the formation of fruiting, as well as of vegetative wood will be found in Prof. Lord's paper published in the 1928 report of this Society.

Grapefruit trees under normal conditions require a 4-8-3 fertilizer in February with half of the ammonia derived from chemicals, because as a rule the rainfall for the succeeding three months will be light. In May a 3-8-8 formula, largely organic, is used. In addition to that, the trees which still show exhaustion or sparse foliage from carrying too heavy a crop the preceeding season are given an application of Peruvian Guano at the rate of five pounds for an eight year old tree; up to ten or twelve pounds for one fifteen years old. The remarkable response of run down grapefruit trees to an application of Peruvian Guano is so startling as to be almost phenomenal and it should be more largely used in our grove practice. If guano had been used in the organic blocks at the Lake Alfred Station, instead of dried blood or manure, I am confident the trees would have made a far better showing than they did. The growth resulting from guano is free from frenching and has that vigorous character often lacking in a tree which has been fed with chemical sources of ammonia.

When one bears in mind the fact

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Mediterranean Fruit Fly

Business Interests and Eradication Work

By B. L. Hamner, at Meeting of Florida State Horticultural Society

When Mr. Floyd wired me in Philadelphia to speak upon the subject of the relation of the business interests of the State to eradication work, I gladly and immediately accepted, because there is a very definite relation of the business interests to this work and its importance cannot be over exaggerated.

There is present at this moment the necessity of selling the idea of the importance of this work to the business interests.

One who thoroughly understands selling knows that there are certain appeals necessary in making a sale and that they are but five in number. You must convince a man that if the sale is consummated he is going to derive pleasure out of the consummation, or that there will come about a situation in which he will have pride, or that from the consummation of the deal he will derive profit, or must show him the usefulness of the thing with respect to what he does, and this is generally called the utility of the thing, or again you must show him that unless he does buy certain undesirable things will take place which will cause him loss, inconvenience, worry, or some of the unpleasant things of life, and this appeal is called the appeal to caution.

Most certainly a presentation of them to the business interests can use the five appeals of pleasure, pride, profit, utility and caution.

In order to approach this matter and get a true perspective, we must look back and see what the effect was when the discovery of the Mediterranean Fly became public, and see how it affected the individual and particularly the business interests of the State. The very announcement brought fear almost approaching the state of panic to the people, and certainly a man did not experience pleasure where his mind was filled with fear.

As much as we all love Florida, it certanly would not give us a feeling of pride in the State of Florida when it was heralded to the world that another calamity was impending or upon us.

To have merchants all over the country featuring California fruit and with signs proclaiming that there were no Flies in that fruit and that they were not using Florida fruit infested with the Mediterranean Fly, would not work to the profit of the grower nor to the profit of the State.

I cannot stretch my imagination to include any useful purpose in having the pest in the United States and particularly in Florida, and I am confident that it would be a diseased mind that could picture an inconvenience and a harmful thing that would come upon us by eradication.

This analysis shows that the effect was exactly the converse of a true sale.

Let us be more specific and recount but a few effects the discovery of the fly had.

We all met the grower who said that it was the last straw to break the camel's back, and until they knew that they could move fruit without embargoes, and that if the jig was not up they would not buy any more fertilizers and spray materials and throw it upon the ground or trees, but that they would conserve what they had for the impending catastrophe. The fertilizer and chemical interests were thereby immediately affected and their labor was immediately affected, and the merchants with whom they dealt, the landlord from whom they rented, and so on down the line, were all immediately affected by that thought.

There were grove buyers in the State who had made up their mind that the time had arrived when the citrus industry had been stabilized and that prices were subnormal by reason of other conditions, and that the time to buy groves had arrived. The announcement immediately caused sales of groves to cease and that prevented an inflow of money from other States that would have circulated in all the channels of trade. There was a decline in grove prices and sales were almost impossible, and credit based upon citrus was almost entirely withdrawn. The grower thus affected conserved his cash, either stopped buying altogether or curtailed his buying.

There came about an immediate readjustment of ideas on credit extensions and the lines were drawn tighter and credit, to put it mildly, was difficult.

Most of you heard of individuals, or were possibly one of them, who said the extent of this may be unlimited and it may break the banks and I will get my money and put it in a safety deposit box or in some other place.

If you did not hear such an individual, you certainly know that many banks began to close their doors and you can imagine the thought in minds of those withdrawing their cash.

When banks began to close, the remaining banks began to call upon the borrowers to pay their loans and restricted any new loans most stringently. Merchants called upon to pay loans began to make sale at cost or without profit in order to realize cash. The merchant that was trying to do business at a profit had to meet the competition or carry on at a loss, and avenues of credit were closed and the circulation of cash got to such a point that in Tampa, for instance, a day's clearing got down as low as $150,000.00, when a normal day would be from Five Hundred Thousand to a Million and a Half.

I trust that you know that in this country we have not enough cash to pay the taxes assessed annually. Therefore, business must be done largely upon credit, and credit is based upon confidence, and we had lost that.

The circulation of money in business is very much like the circulation of blood in the human body. When it ceases to circulate it congeals and death is the immediate result, and when money ceases to circulate, a business stagnates.

Combine the slow circulation of money in the community and the almost entirely closed avenues of credit, and it is truly a wonderful place that can live through it.

So much for what actually took place, and picture, if you can, what would take place should there be placed an embargo on all of our citrus fruit and such vegetables as are a host to the Mediterranean Fly.

What crate mill would open its doors, what orange grower would continue to buy fertilizer and spraying material, what would be the use of opening the packing houses, what would be the use of buying paper and wraps?

Continued on page 22

The Citrus Industry

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RELIEF SEEN IN FLY SITUATION

After months of wrangling and partisan strife over an appropriation for continuation of inspection work, and just at a time when growers had about given up hope of favorable action, the appropriations committee of the lower house of congress has recommended an appropriation of $1,740,000 for inspection and control work and a special emergency fund of an added $1,500,000 to be used only at the request of the president in event of a new outbreak of infestation of the Mediterranean fruit fly.

This amount is much less than had been asked for by the president and the secretary of agriculture, and less than had been hoped for by Floridians in close touch with the work and the situation. However, we believe that there should be no quarrel on the score of the amount recommended. The important thing now is to secure speedy action on the recommendation, to the end that the sum alloted may become immediately available for the resumption of work under the federal fruit fly board at Orlando. If the fly has been whipped, the sum recommended may be sufficient to continue inspection and control until the quarantine has been lifted. If there should be new infestations, the emergency fund should care for the work until further aid can be provided. We should be thankful for what we have been able to get, and proceed to make the most of it.

Coincident with the announcement of the recommendation of the committee, announcement was made that the department of agriculture had lifted the quarantine regulations on tomatoes, egg plant and sour limes produced outside the fruit fly areas, when they were removed from peppers, lima and broad beans.

On the same day, in the senate, Senator Fletcher introduced a bill to provide $10,000,000 to pay growers for losses sustained on account of the fruit fly work, and in the lower house, Representative Ruth Bryan Owen introduced a bill to authorize the secretary of agriculture to appraise the losses to Florida growers and the secretary of the treasury to reimburse them.

The situation as it now appears is very encouraging and the recommendation of the appropriations committee particularly has done much toward clarifying the atmosphere which has been burdened with a spirit of pessimism for many months. If all interests will now work together, we may look for a rapid improvement of conditions all along the line, and with a bright outlook for the future of the industry.

ANNOUNCEMENT

Mr. S. Lloyd Frisbie, who has been connected with Associated Publications Corporation, financially and as a director, ever since the inception of the organization more than ten years ago, but who has not been actively affiliated with the management of the Corporation, is now aggressively associated with the Company and its publications, of which The Citrus Industry is one.

Mr. Frisbie is an experienced publisher, having been engaged in newspaper and publication activities from early life. For the past twelve years he has been connected with one of Florida's leading daily newspapers. He brings to Associated Publications Corporation a knowledge of the publishing business and a record of efficiency second to that of no Floridian engaged in similar work.

The Citrus Industry takes pride in the addition of Mr. Frisbie to its staff and that of its associated publications, and feels that his closer affiliation with the business and editorial departments of the publications controlled by Associated Publications Corporation will add greatly to the strength and standing of the Corporation itself and of the publications which it now owns or which it may hereafter acquire.

We feel that Mr. Frisbie's many friends throughout the state will join us in welcoming him into active participation in the affairs of the Corporation.

SHIPPING CANNED GRAPEFRUIT FROM FLORIDA PORTS

The Jacksonville District Office of the United States Department of Commerce reports shipments of canned grapefruit from Florida ports from the beginning of the current season up to and including April 26, 1930, of 64,404 cases. Of this number 56,135 went to the United Kingdom; 8,179 cases to Canada; 40 cases to Germany; 25 cases to the Netherlands; 25 cases to Italy.

The demand for canned grapefruit, like the demand for fresh fruit of this variety, is said to be growing in each of the countries mentioned.

Fruit fly or no fruit fly, the grower who produces fruit of the finest quality and most attractive is the one who will reap the greatest profit.

Citrus fruits, Gulf States

Culture of Citrus Fruits In The Gulf States

By E. D. Vosbury, Formerly Scientific Assistant, Office of Horticulture, and T. Ralph Robinson, Physiologist, Office of Horticultural Crops and Diseases, Bureau of Plant Industry

(Reprinted from Farmer's Bulletin No. 1343 U. S. Dept. of Agriculture)

(Continued from last issue

The Meyer lemon, a dwarf Chinese form introduced by the United States Department of Agriculture in 1908, has proved to be so resistant to cold injury that it is being planted for local use along the Gulf coast from Florida to southern Texas. It withstands temperatures down to 20° F. without injury and may survive even lower temperatures. It differs in shape and appearance from other lemons of commerce, being nearly round, and smooth, and is probably a hybrid form. It is doubtful whether it will prove a successful competitor in the large markets of the North with the true lemons, but it should be a welcome addition to the home fruit garden and small grove designed to supply local needs.

Lime Varieties

The Florida lime crop is gathered almost entirely from seedling trees grown on the keys and in other tropical regions of southern Florida. The fruits of these seedling trees are very variable in size and shape and are known commercially as Mexican or key limes. Some ripen every month in the year, but the main crop is harvested in the summer. The propagation of the best types by budding would doubtless lead to the production of larger and finer crops that are obtained from the seedling trees commonly planted.

The Tahiti variety is a budded sort that has been planted recently in southern Florida. It is a somewhat stronger grower and a trifle more hardy than the Mexican seedling limes. The tree is vigorous and usually is a prolific bearer. The fruit is similar in size and appearance to a small lemon. It is of excellent quality for home use and may eventually become of commercial importance, although at present the northern trade prefers the smaller key limes.

Kumquat Varieties

The varieties of kumquats grown are the Nagami and the Marumi. The Marumi bears small spherical fruits, while the Nagami bears larger oval-shaped fruits and is preferred to the Mrumi for all commercial planting.

The Meiwa variety, recently introduced, is of the highest quality for eating in the fresh state. In size it resembles the Nagami, but it is more nearly spherical in shape. It is sometimes called the "sweet kumquat." On the trifoliate stock it is inclined to be lacking in juice; it is not as hardy as the other kumquats.

New Varieties of Citrus Fruits

A number of interesting new fruits have been originated by the crossing of various citrus parents. Among the most promising of these fruits is the tangelo, a hybrid of the tangerine and the grapefruit, the Sampson being the favorite commercial tangelo of this group of hybrids; the Eustis limequat, and the citranges, a group of hybrids between the sweet orange and the trifoliate orange which are of considerable value as hardy substitutes for the lemon and as ornamentals in regions too cold for growing even the hardiest of standard citrus varieties.

In the Eustis limequat, a hybrid between the lime and the kumquat, is available an attractive fruit for home gardens and local markets which serves every purpose of the lime or the lemon but which is fully as hardy as the common orange. It is very prolific, almost everbearing and is immune to lime wither tip. It grows well when budded on all the common stocks used for citrus except the sour orange. For making ade or for shipment the fruits should be picked when still partially green, as they lose flavor and acidity when allowed to mature fully.

New varieties of citrus fruits originating as chance seedlings or as bud sports or brought to light by foreign exploration are claiming attention from time to time. The Temple orange is a new variety brought to light at Winter Park, Fla. It is characterized by a deep-red color, thin rind, rather large size, and somewhat flattened shape. It is a midseason variety. Some extensive plantings of this orange were made about 1920, but commercially it has not proved to be a success because of a tendency of the fruit to dry out before reaching maturity. It appears to be better adapted to sour-orange than to rough-lemon stock. Where the Temple orange is being budded over to other varieties it is not advisable to bud into the upper branches, as the growth following has not proved satisfactory. The better procedure is to cut back to the stock (usuall rough lemon) and bud or graft into this stock.

The Golden Ring is another highly colored orange of rather small size, maturing early that is being tried out in some sections.

Although new varieties when promising ought to be tested, such new sorts should not be exclusively planted until they have demonstrated by their behavior in a practical test for each locality and soil type that they are superior to existing standard varieties in some leading characteristic,

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Citrus Stocks

Citrus trees for planting are usually budded on sour-orange, rough-lemon and other seedling stocks. The problem of selecting the best stock is of great importance, for in case an unsuitable stock is used the value of the grove may be permanently impaired. Sweet-orange seedling stocks were formerly used very extensively, but as they have been found very susceptible to foot rot they are now seldom planted.

The sour orange, a hardy species of citrus, which is frequently found growing wild in Florida forests, is the leading stock in Florida as well as in California and most of the citrus-growing regions of the world. It is vigorous and resistant to foot rot, and the trees produce thin-skinned fruit of fine quality which holds to the branches late in the season. In Florida sour-orange seedlings are the favorite stocks for hammock and flatwood soils as well as the best grade of pineland. Most growers prefer sour-orange stock wherever soil conditions permit its use.

On light, dry, sandy soils in southern Florida, where sour-orange stock lacks thrift, the rough lemon, a vigorous-growing species of citrus related to the common lemon of commerce, is used. Trees on rough-lemon stocks make a very vigorous growth and on very light soils are easier to care for and require less fertilizer than trees on sour-orange roots. Rough-lemon stocks are tender and not sufficiently hardy for Gulf State sections colder than southern and central Florida. Under favorable conditions trees on rough-lemon stock usually are vigorous and productive, but it is claimed by many growers that the life of such trees is shorter than on some other stocks. The fruit produced by trees on rough-lemon stock, while often good in dessert quality, is frequently inferior to that grown on sour orange, and it can not be held on the tree so late in the season. Tangerine trees grown on it will usually not hold their fruit after the middle of January. The Parson variety of orange is seldom successfully grown on rough-lemon stock.

Grapefruit seedlings have been used as stocks to a limited extent in southern Florida. They are too tender for the colder sections of the State. This stock is more vigorous in growth than the sour orange but less vigorous than the rough lemon. It is best adapted to moist soils well supplied with humus. As grapefruit seedling stocks are less hardy and less resistant to disease than sour-orange stocks, the latter are generally more satisfactory.

The trifoliate orange, Poncirus (Citrus) trifoliata, is the hardiest stock for citrus fruits in common use. It is deciduous and has a distinct dormant season in the winter. This dormancy has the effect of checking the winter wood growth of varieties budded on it, causing them to be less susceptible to low temperatures. For this reason trifoliate-orange seedlings are much used as stocks in the colder sections of the Gulf States. They are rarely desirable as stocks in southern and central Florida and have given unsatisfactory results in the Rio Grande Valley section of Texas, where the sour orange is the preferred stock for all varieties.

The trifoliate-orange stock is best adapted to fairly rich moist soils and is unsuited to light dry soils. It is particularly well dapted to sandy loam soils with a clay subsoil. On the proper soils it produces thin-skinned fruit of high dessert quality. It has a tendency to dwarf the growth of the tree budded on it. In the lower Mississippi Delta, Washington Navel oranges are frequently budded in trifoliate-orange stock, and while the growth is less vigorous in that locality, they are more prolific than when

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budded on sour-orange stock.

Two other stocks occasionally used and apparently possessing much merit in some sections of Florida are the bitter-sweet orange and the Cleopatra mandarin. The latter has the advantage in the nursery of immunity to citrus scab, and possesses the attributes of the sour orange in resistance to foot rot and in hardiness, but is not adapted to low, wet soils as the sour stock is. Buds on Cleopatra stock should usually be planted after one year's growth in the nursery, since trees held in the nursery for longer periods are rather difficult to transplant without losses. The transplanting of buds on Cleopatra stock should be done only when they are thoroughly dormant. Cleopatra is chiefly promising as a stock for tangerines, Satsumas, and kumquats, in well-drained, sandy soils.

Lemon and lime seedlings are occasionally used as citrus stocks but are too tender for general planting.

Selection of Bud Wood

The source of bud wood used in propagation is an important consideration.

Investigations conducted in California by the United States Department of Agriculture have shown that there is a great degree of variation within the standard citrus varieties grown in that State. When these variations of trees or fruit are very marked they are known as strains. Each strain, while retaining the general characteristics common to the variety, has clear-cut differences, either in character of fruit, foliage, habit of tree growth, or in production of fruit, so that it can be easily distinguished from other strains of the same variety. Furthermore, the trees of some strains are more prolific and bear much finer fruit than other strains of the same variety.

These investigations have also shown that trees propagated with selected buds from parent trees of these best strains perpetuate the characteristics of these desirable strains and come into bearing earlier and bear heavier and more uniform crops than trees propagated from buds that are not so carefully selected.

Similar differences have been found to exist in the various varieties of citrus fruits grown in the Gulf States. In purchasing citrus trees for planting, growers should ascertain that they have at least been budded from trees which are true to the varietal name and if possible from trees which have a reputation for producing large quantities of fine fruit.

(Continued next issue)

ANOTHER PROMISING CITRUS INDUSTRY SEEN

John H. Shary, president of the Texas Citrus Fruit Growers' Exchange of Mission, has started another industry which will, in all probability, have a decided effect upon the citrus industry, says the Mission, Texas, Times. Shary Products Company, whose first plant is now operating at Donna, is engaged in the manufacture and sale of "Rio Rey", which is bottled Texas grapefruit juice. The juice is obtained from grapefruit which cannot be profitably sold on the nations markets and which have heretofore been thrown aside to waste. Instead of destroying this cull grapefruit, Shary Products Company will turn it into a profit-making industry in which the entire Lower Rio Grande Valley will share. Just as large factories add to their profit by the sales of by-products, so will this company add to the Valley's citrus income by using cull fruit which is not of sufficient size or attractiveness to sell easily. The full possibilities of this new industry have not been realized by residents of the Valley but after the first two or three seasons, John H. Shary's foresight will again have been proven.

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IMPRESSIONS

By The Impressionist

Karl Lehmann of Orlando, the orange grower who is better known as the secretary of the Orange County Chamber of Commerce, tells of one day, about ten years ago, when he walked into a soda dispensary in Victoria, British Columbia, and ordered a coca-cola.

"Be we serve only soft drinks in this establishment," said the manager.

"Why coca-cola is a soft drink," said the thirsty one.

"Sir, we will not debate the matter," was the retort of the Canadian. And that was that.

The late Dr. J. H. Ross was fond of remarking now and then apropos of some new difficulty in the way of producing or marketing citrus fruits: "Well, if it were not for some difficulties intervening, the whole population of the United States would be down here in Florida growing oranges and grapefruit, and then where would our consuming public be?" From the way the census figures are coming in from over the citrus belt it looks as if a whole passel had pushed their way in already.

Just mulling things over, it is our impression that the manufacturer of men's clothing who is able in his own mind to approximate the closest what the wearers of such clothing will be thinking of, and searching for, when they are buying will without doubt be the most successful man in his line. The same should be true of producers of motor cars, of shoes or what not. Then why wouldn't that also apply to producers of fruit, more particularly producers of citrus fruit?

Bridget Moriarity wants "a bit of fruit" for Mike's lunch pail. Those sandwiches are dry eating. She hasn't too much to spend. Price will cut a figure; and looks will count a lot. If the the size is too big, and the price is up to correspond, she may be satisfied with something else instead of an orange.

Mrs. Riverside Drive lives in a New York apartment. She and her husband play a lot of bridge, trot a bit. There's a silver cocktail shaker on the table of their living room. Generally she buys oranges from a nearby delicatessen store, in units of three oranges. That's her habit of buying, and the store's habit of selling. Most of the oranges she buys go into cocktails. They must be bright and look good, of course, for she wouldn't for worlds have the Smiths, who are dropping in for bridge, think she was economizing by buying cheaper fruit; but against the synthetic gin of the cocktail mixture flavor and maturity cannot count for much. Provided outer appearance is all right, Mrs. Riverside Drive is easy to satisfy, except that she long ago learned to look for juiciness too. It's the women, and the men, like her who largely account for New York's unfailing willingness to take the top grade juicy Florida oranges in great quantities at all times in season at prices which have nothing whatever to do with what other parts of the country may be paying or willing to pay.

Mrs. Peoria Jones had a lot of trouble with her baby. She was bringing the baby up on a bottle; and it wasn't doing well. A children's doctor explained to her that the city milk by reason of being pasteurized was devoid of vitamins; and that in the absence of vitamins baby's system was not able properly to assimilate the nourishment contained in the milk and the infants' food which was introduced into it. Since then baby has been getting small but regular rations of orange juice; and baby has been doing fine. Mrs. Jones has become a connoisseur of oranges, for whatever affects baby obtains her best attention. She can even in a way distinguish where the oranges have come from. That is something mighty few consumers care anything about, even think about. Mrs. Jones, however, has asked a lot of questions, and has a memory for details. She wants her money's worth, but nothing is too good for baby. Mrs. Jones is hard to fool on oranges. Once she got some immature oranges, and then baby was quite sick. No one again will sell immature oranges to Mrs. Jones, even if they look ripe to the casual inspection.

Mrs. Calloway Perkins likes her "people" to be well fed, within the limits of what they pay to her for board and rooms. For years she has generally had fruit upon the breakfast table. There must be variety, of course, but comparative prices probably will decide whether it will be apples, prunes, oranges, grapefruit or whatever on the table for tomorrow's breakfast.

"We eat a tremendous quantity of fresh fruits. They are so healthful, don't you think?" Mrs. Fountain Square of Cincinnati, says it, and she means it. She reads all the best women's magazines; and she has been lectured to by dietetic experts at club meetings. She not only has fresh fruit upon the table, but she likes to have it about the house. Particularly in that large cut glass bowl upon the sideboard which Cousin Will gave her. As the sideboard is in direct view through the broad opening from the living room, she likes to have that bowl all dressed up with polished and bright fruit. In fact, it was only when Mr. Fountain Square brought home from a business trip the idea that he wanted his orange juice all squeezed into a glass that she began to pay any attention to the relative juiciness of the oranges in the market.

Continued on page 24

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Reasoner Brothers'

ROYAL PALM NURSERIES

Oneco, Florida

BLUE GOOSE NEWS

Monthly News of American Fruit Growers Inc. *Edited by The Growers Service Department*

VOLUME 4.—NO. 6 ORLANDO, FLORIDA, MAY, 1930 PAGE 1

QUALITY PLUS VOLUME A MARKETING ADVANTAGE

Volume of handlings, "tonnage" as the perishable trade tersely expresses it is an important advantage in selling fresh fruits and vegetables. Important as volume is to any marketing organization, and to the growers served by that organization, quality is of even greater importance. The policy of the American Fruit Growers Inc. of specializing in quality, and the success which has attended its operations, resulting in a very large volume of tonnage of the highest quality production from a number of producing sections, places the organization in a position of unique advantage. Every grower served by it shares in that advantage.

The direct and indirect benefits of handling a very large volume of quality products in various lines of fresh fruits and vegetables, all selling through the same wholesale and retail channels, is quite clearly exemplified in this instance. Due to the fact that each item in its varied line of seasonable fruits and vegetables adds to its volume of quality products, each item thus tends to strengthen the structure of the selling organization, adds to prestige, makes the organization more essential to the trade, and obtains a larger recognition from the consuming public for the Blue Goose trademark.

Thus a new citrus packing house in Florida flying the Blue Goose flag is not boosting for every other Blue Goose citrus packing house, and every Blue Goose citrus grower in Florida, but it likewise directly benefits Florida growers of Blue Goose celery and tomatoes, Northwest apple growers, Imperial Valley cantaloupe growers, Colorado iceburg lettuce producers, Ohio truck gardeners, Georgia and North Carolina peach growers, and the whole host of fruit and vegetable producers whose products in their due season move to market under the Blue Goose trademark.

Continued on page 2

MANATEE COUNTY WILL NOW HAVE AFG HOUSE

With the opening of the next shipping season Manatee County citrus growers will have opened to them the benefits of a directly operated American Fruit Growers Inc. packing house conveniently situated in their midst, all re-equipped and manned by experienced AFG personnel.

The well known Springhead packing house at Palmetto, long operated by I. E. Springhead & Son now becomes a full fledged AFG operation, and beginning next season will offer grade, pack and selling service which will afford the early maturing Manatee County grapefruit its proper place in the markets.

This new Palmetto house will be under the direct management of S. D. Gaines, one of the best known and most successful of the AFG operating men in Florida Mr. Gaines' many years of experience and unusual success on the Indian River promise much for putting the Palmetto brands to the front rapidly.

In addition, Manatee County operations now will come in for the personal attention of A. B. Michael, regional vice-president of the American Fruit Growers Inc. One of the best known and most successful Florida citrus growers, Mr. Michael has since the beginning of its Florida operations personally directed the Indian River activities of this organization, the success of which is too well known to require comment.

Plans for the Palmetto operation are made possible by the high quality average early maturity of the Manatee County citrus crop, permitting the Manatee operations to come in for the best attention of these experienced Indian River operators before the time when their attention turns to later East Coast activities. The assured pack and grade of the Manatee fruit under this management, and the merchandising plans now being worked out for it by the sales department under C. N. Williams, salesmanager, will give this early maturing crop for the first time its fullest opportunity to demonstrate its real value in the markets.

NEW AFG PACKING HOUSE AT AVON PARK

Construction already has begun upon a new and modern packing house for the American Fruit Growers Inc. at Avon Park. On a site upon the Seaboard Air Line Ry. opposite the station of that line in Avon Park the preliminary clearing and grading has started. Plans and specifications have been approved, and construction will be finished during the summer months. The new house will be complete and ready for business by the opening of next shipping season.

A temporary office has been opened in the Sun Arcade under the management of J. H. Powell, where business will be transacted until the office quarters in the new packing house are completed.

The new packing house will be modern in every way, and will include in addition to the electric marking machines those innovations recently tested and proven by the AFG packing forces, representing the last word in citrus packing efficiency.

With the establishment of this plant at Avon Park the American Fruit Growers Inc. make their initial bow to the citrus growers of Highlands County as part and parcel of the county's citrus industry, though in the last few years a considerable tonnage of Highlands County fruit has been shipped to points northward and handled for Highlands County citrus growers at one or another AFG packing houses outside the county.

The continued and growing demand for AFG selling service in the markets upon the part of citrus growers in this section is responsible for the establishment of this new packing plant, and the direct extension of AFG marketing facilities to this now very important citrus producing area.

Continued on page 2

Adv.

BLUE GOOSE NEWS

OFFICIAL publication of the American Fruit Growers Inc., Growers Service Department, published the first of each month in the interest of the citrus growers of the state of Florida.

EDITORIAL ROOMS
Sixth Floor, State Bank Bldg.
ORLANDO, FLORIDA

WORKING TOGETHER

First evidence of a sincere desire of various factors to work together for the better and more effective marketing of the Florida citrus crop came several years ago with the formation of the Fruitman's Club.

That was a somewhat nondescript and ambiguous title for the organization of shippers and growers. It sounded like a social body, and to an extent it was one. First came a dinner at each meeting time, and considerable sociability. That in its way was good, for the better acquainted men are with each other the better they are apt to think of, and to act toward, each other.

Dinner, however, was but preliminary to a real business meeting when the plates had been cleared away and the waiters had departed from the room in which dinner had been held. In its time the Fruitman's Club was the one most constructive effort in the Florida citrus field.

Now we have the Florida Citrus Growers Clearing House Association, cloaked with the full legal authority to do openly and above board all those things which the Fruitman's Club could attempt only by "gentlemen's agreements;" and often these agreements were of very doubtful legal propriety. With this great advancement in the machinery for working together we no longer need to take heed of the number of factors involved in marketing the Florida citrus crop, but solely of their disposition to be constructive and their ability to work with others.

The American Fruit Growers Inc. is justly proud of its membership in, and its close adherence to, the old Fruitman's Club. It is now glad for the existence of the Clearing House and for the opportunity to do its part in connection with the operations of the Clearing House. Always it is the aim of the American Fruit Growers Inc. to be constructive, to build up, not to tear down; and always its best efforts will be given in behalf of every worthy undertaking for the common benefit of the industry.

Adv.

NEW AFG PACKING HOUSE AT AVON PARK

Continued from page 1

This new house will even in the beginning serve a very considerable acreage of groves noted for their production of good fruit; and promises to play an important part in putting Highlands County oranges and grapefruit upon the map, by aid of the Blue Goose trademark.

QUALITY PLUS VOLUME A MARKETING ADVANTAGE

Continued from page 1

Similarly a strengthening of the standing of the American Fruit Growers Inc. standing in the Northwest boxed apple deal directly and vitally benefits Florida growers, and other growers everywhere, served by the American Fruit Growers Inc.

This great national sales agency for growers was a pioneering organization. In its beginning it was unique. Today, even after more than ten years of successful operations, it still stands practically alone. Here is a business organization, proceeding upon strictly business lines, without any affiliation with buying units, serving producers of fruits and vegetables of known quality by marketing their products in the most effective and modern way, and serving the wholesale and retail perishable trade by supplying their requirements of such quality products in season throughout the year.

Its signal and outstanding success has amply proven the correctness of the planning of those who sponsored its formation. Its continued strengthening of its financial position, while rendering superior selling service to an ever increasing number of individual growers, cooperatives and commercial producing concerns alike, and at the same time holding the highest regard and esteem of the trade, demonstrates the soundness of the principles upon which it was established.

Quality needs no argument in its behalf, whatever the product involved. Volume posseses its own advantages. When through good fortune the feature of quality is combined with the great advantages of large volume in the total the combination is tremendous in its application.

The American Fruit Growers Inc. sought quality. It sought to serve only producers whose products were distinguished by quality. It sought to supply only the quality requirements of the trade. The Blue Goose trademark thus became, and continues to be, a symbol of quality, a synonym for highest grade. Volume came of its own accord. More and more growers saw the advantage of their own quality products going to market in company of other products of quality. More and more dealers found that their interests were best served by featuring their handlings of those fruits and vegetables distinguished by the Blue Goose trademark. More and more housewives learned that this same Blue Goose trademark was to them a more reliable safeguard, a more dependable guaranty of quality than anything else they had knowledge of. Thus the handlings of the American Fruit Growers Inc. increased, and continued increasing, until to the known advantage of quality was added the great advantage of very large volume. That allows operating economies, makes possible a very reasonable basis of charges, allows the performance of special services to be included without being specially assessed upon the growers.

Further, because of the wide extent of operations, both quality and volume are steady and continuing. Intermittent spurts of business, or large volume during only certain months of the year with little or no volume during others, could not permit of the methods of operation of the American Fruit Growers Inc., which are made possible by a volume of quality products that is continuous and steady throughout the year.

Wholesalers and retailers handling fresh fruits and vegetables very greatly appreciates what this organization means to them. Just as the housewife turns to the big store on the corner for supplies, feeling sure that there she will be able to obtain all the items she desires, and overlooks the bid for business of the eager but less well stocked smaller rival

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JACKSONVILLE, FLA

Not because of bigness, but grown biggest because of ability to render superior service—and continuing to grow because able not only to maintain but to improve upon that service.

AFG

up the street, so do wholesale buyers naturally enough turn to the big marketing organization for their requirements. Given the feeling that at some time during the day it is going to be necessary to do business with the large organizatin in order to obtain some needed items, it is but following the line of least resistance to allow the large organization first opportunity to supply the day's requirements. That is perhaps one reason why so many dealers feature complete lines of Blue Goose products in season, and fill in with other lines only as necessity requires or bargain prices are offered.

The part which a continuous large volume of seasonable offerings of known quality intelligently handled can play in marketing perishable foodstuffs is splendidly exemplified by the American Fruit Growers Inc. It is well worthy of the careful study of those growers of quality products who are in a position to profit by such an operation.

NATIONAL GEOGRAPHIC TELLS OF BLUE GOOSE

The April issue of National Geographic Magazine, the official organ of the National Geographic Society of Washington, presents upon page 414 an interesting picture of the great flock of blue geese wintering each year in the vicinity of Vermilion Bay, Louisiana.

Recent research has definitely located the home and nesting place of the wild Blue Goose in far north Baffin Land; but in winter these beautiful birds seek refuge in the marsh lands along the Gulf of Mexico in Louisiana. Here they have made their advent with the beginning of each winter as long as there are records or traditions of white inhabitants of that section of the Gulf Coast; but with the coming of early Spring they stage a complete disappearance, the mystery of which was solved only with the recent discovery of their Baffin Land home. The explanation for the mystery of years is now attributed to their making a non-stop flight each year on their trips between the far North and the Gulf of Mexico.

Adv.

AFG PERSONALITIES

F. M. LILLIE, ADVERTISING MANAGER, from his office in Pittsburgh he directs and synchronizes the advertising which keeps the Blue Goose trademark the one best known to the public in the perishable field. He also supervises the dealer-service work which is an important item in Blue Goose merchandising.

TAMPA MERCHANTS
Seek Growers' Trade

The undersigned Tampa Merchants realizing the importance of the trade of growers located in the Tampa trading area have made offerings in this month's Citrus Industry which they feel will offer an unusual appeal to the growers and their families located in that area.
The matter of distance means less today than ever before in the history of the country. Fifty, Sixty or seventy-five miles now-a-days is the rule rather than the exception, when Tampa offers values that appeal to those in its trading area. The undersigned merchants are aware of the vast importance that the citrus industry plays in the welfare, not only of Tampa's trade territory, but of Tampa itself.
We want your business—we have made many attractive offerings to be found in this publication, in order to get it. Incidentally we will appreciate suggestions as to merchandising or shopping plans which may make our establishments more attractive to you—Mr. and Mrs. Grower.

BAILEY, THE CLOTHIER
514 Franklin St.

GOURLIE MUSIC CO.
309 Zack St.

HOLTSINGER MOTOR CO.
1101 E. Broadway

PRINCESS BOOT SHOP
812 Franklin St.

TAMPA HOLTSINGER FURNITURE CO.
Tampa & Madison Sts.

TAMPA - - - - - FLORIDA

YOU CAN MAKE A LITTLE MONEY BUY A LOT OF AUTOMOBILE

Now that you have sold this year's crop, you naturally are interested in making your money go as far as it will. All of us are the same in that respect—whether we have a lot of money or just a little, we have acquired the mighty good habit of making it cover all the ground it can be made to do.

So We Are Making Some Ridiculously Low Prices on Used Cars And Trucks For Cash

Frankly we are placing these figures so low that any citrus grower may well afford to come a hundred or two hundred miles, if necessary to get the big savings we are offering.

All Our Used Cars Guaranteed

Every used car or truck we sell is guaranteed to be in first class mechanical condition. Our reputation in the automobile business in Tampa has been built on our record of standing back of every guarantee we make, so regardless of the prices offered you know that what you buy from us will render good service.

USED TRUCKS

Buy what you will need for summer and fall NOW—prices will not be so low later on.
Priced all the way from
$35 to $350

USED CARS

Whether you need another car just to "knock around" in or for best use you save money here.
Make your choice at prices ranging from
$75 to $445

Yes, we'll trade in your old car if you want to.

HOLTSINGER MOTOR COMPANY
Authorized FORD Dealers
1101 E. Broadway at Eleventh Street **Tampa, Florida**

"Please Say You Saw It in The Citrus Industry"

BUSINESS INTERESTS AND ERADICATION WORK

Continued from page 11

Follow the results a bit further and see whether the effect would be upon all lines of merchandising in every city, town and hamlet, and with the failure of the merchants, what would the owner of the property who failed to get his rent do, and then what prospect would there be for him to sell that property without rent returns, and last of all, what business would there be that would not be affected.

The Doctor could not collect for his visits from those out of employment; the banks would have no basis upon which to extend credit, the borrower would have no cash with which to pay sums already borrowed.

This is a dark picture, I grant you, but it is entirely within the realm of possibility and comes within the realm of probability if the Mediterranean Fly campaign isn't carried on.

Florida has made a wonderful record. It has made a reputation for courage and it is great beyond the comprehension of most of you.

Do you know that from 1926 to January, 1930, that the Banks of Florida paid out in cash withdrawals more money than most of the Southeastern States ever had. The cash withdrawals from the banks in Florida were over Six Hundred Million Dollars, and that is more money than there ever was in the banks of most of the Southeastern States, and yet on that day they had approximately Five Hundred Million Dollars left, and the most surprising thing is that they had more cash on hand compared to the deposits than any State in the Union.

Who of us is not proud of the fact that we had citrus canker and that we eradicated it, and set a precedent that has made the path easier in this important fight.

Who is there among us that is not proud of the fight that was made under the leadership of Wilmon Newell, and that we had with us one big enough to appreciate the grave danger, one who realized that it was a situation that could not be half heartedly handled, one who had the sense of organization and the knowledge of our country which enabled them in a few short days to reach every citrus grove in the State and one with the courage and the nerve to handle it in a big way, and spent millions to immediately get the results, and one who had the vision to see the countless millions it might cost to fail to take the drastic steps, and to make mistakes, if you please,

Are You Interested In Florida's Greatest Industrial Market?

Really, Mr. Manufacturer and Mr. Merchant, we're not trying to be funny. We just ask you a straightforward, honest question.

The natural assumption is that you would be vitally interested in such a market, inasmuch as the sale of your products is the source of your own profit.

Various sources place the value to the state of the annual citrus crop of Florida at figures running all the way up to a Hundred Million Dollars, but whether that figure is large or small, one thing is certain—the Floria citrus crop represents the largest industrial enterprise in this state.

So whether you sell fertilizer or machinery or insecticide or shoes or clothes or furniture—or any of the numerous other things which the well-to-do grower uses in the conduct of his business or in supplying the needs of his family, we maintain that this market is too valuable to overlook.

This group of the cream of Floria's citizenry, while numerically small, control the expenditure of more money and the production of more revenue than any other group of productive industry in the state of Florida.

Every discerning manufacturer or merchant realizes that no matter how good his product nor how attractive his values may be—that without a responsive market his goods will not sell. But with reliable merchandise, honest values and a market receptive to his appeal and amply financed to buy if they desire—an ideal selling condition has been obtained.

Such a condition does apply in the citrus field today, so far as it applies to the commercial citrus growers. So the manufacturer or merchant operating in Florida today who persists in crying "hard times," instead of going after a ready-made market, is simply blinding himself to opportunity.

The Citrus Industry reaches this desirable market effectively. It has been doing so for years for advertisers whose appropriations are governed by the direct results they have obtained from Citrus Industry advertising.

but always erring, if it was an error, to the disadvantage of the Mediterranean Fly.

His knowledge, experience and his courage came as a part of the fight upon the citrus canker, and if my memory serves me right, he himself came as a result of our citrus canker fight, and who is there but that knows that an all wise Providence made it so, and that this experience is to but fit us the better to meet the responsibilities of the glorious future in store for us.

If politicians who cannot grasp the necessity of a great army, the drastic and immediate steps and immediate eradication, fail to provide the funds for the fight that must be waged, then the business interests of this State face a situation where every man must take off his coat, give of his time and his services, and an adequate army must be mobilized.

The fight will not be for the interests of the orange grower alone. The fight is for the business interests of this State, banking, industrial and commercial, and he who fails to give of himself, will deserve that which will come upon him.

The people of Florida have been tried by fire. They have proven their worth and in this emergency I know they will be found ready and will not be found wanting, and you who are particularly interested in horticulture must each become a missionary in your community to arouse the business interests to the graveness of the situation and must stir their imagination to the glorious future that is ahead of us if we win, to the pleasures we will have by the increased value of our property, by the ever growing number of new citizens who will come to share our State and its possibilities, and who will not have pride in the days to come that it was given to him to take a small part in the fight, and who is there of us who will not profit by the growth and development that must take place.

As the knowledge of our advantages spread and the story of our courage becomes known, what citizen cannot appreciate the great advantage of the clean-up campaign, the ever increasing returns from an ever increasing crop, and who of us cannot picture the future should we fail.

There is a saying that the quitter never wins and the winner never quits. We are not quitters but we are victors, and in five years we will hardly recognize our own Florida so great will be its growth and development, and I again call upon you as missionaries to know your subject and to sell it, and to sell it well.

Mr. Grower:

As a smart producer you realize the exceptional value of

QUALITY FRUIT

You know that high grade fruit commands a better market and produces a reputation for your fruit that you cannot secure on lower grade fruit.

IN TAMPA and SOUTH FLORIDA

Bailey the Clothier is prepared to give you the best in

—CLOTHING FROM
HICKEY FREEMAN

—HATS FROM
DOBBS

—SHOES FROM
NUN BUSH

—SHIRTS FROM
MANHATTAN

and all down the line, choice furnishing goods bought for discriminating purchasers.

Come in and see for yourself on your next visit to Tampa or write us for particulars. Other growers in every section of South Florida are patrons of ours.

Bailey
THE CLOTHIER
Tampa Florida

514 Franklin

IMPRESSIONS

Continued from page 16

Miss Coralene Jenks is a homebody, and very much interested in domestic science subjects. She thinks a heavy meal without a salad is something not to be considered. Given even a fair opportunity and she will put on a salad making demonstration which would make a professional demonstrator jealous. She's particularly proud of her fruit salad, and has taught nobody knows how many other women to make it. When finished it does look just too lovely, with the almost paper thin slices cut crossways from oranges lying all over the top. Miss Jenks specifies seedless oranges when buying, for seeds in the center make it extremely difficult to cut those slices as thin as she is accustomed to do.

Tony Paggiliucci is muchly traveled, over the East Side of New York. Oranges? Sure, but how much? Gotta be cheap. Not too much money. Tony sells lots of oranges from his peddler cart during the months when other fruits are scarce and very high. But Tony isn't interested in oranges when cheaper fruits get plentiful in the markets. He then lays off oranges until cold weather comes again. Tony has sold some grapefruit now and then, but not many. Price is too big. Oranges, sweet, nice, juicy, looks not count so much.

The Hotel Splendide aims always to afford "the best in season," which really means the best a shade out of season. Whatever Alfred Simmons, the steward, buys must be the very best, and the highest priced upon the market. It must not only be good, but must look aristocratic too. For no guest must for a moment think there is any tendency toward economy in the Hotel Splendide. No small sized fruit need apply. The bigger the sizes the better, provided the eating quality is there; and Alfred knows his business and sees to that. However, there was something of a scandal in the Hotel Splendide one morning last winter. Supplies temporarily running short, a dumbbell back in the kitchens caused Mr. Samuel Spender to be served with an orange which came from Alfred's stock of "juice oranges." For since so many guests have taken to drinking their orange juice out of glasses, Alfred thriftily has been buying some oranges of inferior appearance but superior juice content for less than he otherwise would pay. They are not, however, intended to be served in the dining room in their natural state.

Guilda Yates, Orange County 4-H club girl, was recently announced winner of a trip to the national Club Camp in Washington for her outstanding club record during the past three years, Mrs. Nellie W. Taylor home demonstration agent, has reported.

In writing advertisers please mention The Citrus Industry.

Many Useful Office Equipment Articles at Very Low Prices

One 14-Drawer Kardex 3x5 Cabinet at $55.00
Two 8-Drawer Kardex 4x6 Cabinets at $30.00
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One Burroughs 11-Column Bookkeeping and statement machine. Electrically driven. Original price $715 at $150.00
One Burroughs 17-Column Bookkeeping and statement machine. Original price $1350 at $350.00.
One Multigraph Machine with type and type stand. New $225, now $75.00
Large assortment of reconditioned desks and chairs absolutely as good as new at LESS THAN HALF THEIR WORTH.
Avail yourself of our prompt service and parcel post prepaid delivery on Ledger Leaves, Binders, Blank Books and every kind of office supplies. Rubber stamps, Typewriters sold and repaired. Write or wire,

Office Economy Index, Inc.
515-17 Zack St. Tampa, Fla.

STYLE SHOES TO SUIT EVERY PURSE—

Nowadays every woman has the right to demand that the shoes she buys shall represent in the utmost degree the most modern note in style, as well as containing to the greatest possible degree the elements of comfort and long wear.

We offer what we believe to be one of the most serviceable lines of ladies' shoes to be found in South Florida at the price, and in this range as in all others style is the dominant feature. You get much more for your money's worth in this group which we offer at **$6.00**

Stepping up a little bit, the next style group is a trifle higher priced because the shoes are somewhat better made and in some cases contain better material. But in any case they offer the very maximum of serviceability comfort and style at **$7.50**

In this group we present one of our finest lines—shoes that contain every refinement of manufacture and material, and which will invariably please the most discriminating purchaser. Usually you pay much more for shoes of this character than the price at which we offer them **$10.00**

Princess Boot Shop
EXCLUSIVE FOOTWEAR FOR WOMEN

812 FRANKLIN ST.
—BETWEEN POLK & CASS—
TAMPA **FLORIDA**

Furniture Specials Appealing to Florida Citrus Growers

In order to properly introduce ourselves we are offering most substantial reductions on furniture to all citrus growers. Some of our largest customers are growers located in South and West Florida—but we want more of you numbered among our patrons. Only a few items are shown here but if you will tell us of seeing this advertisement we will be glad to make the same substantial reductions on any of the other hundreds of items in our stock.

A Marvelous Bed Room Suite
(Exactly As Illustrated)

This beautiful genuine walnut bed room suite consisting of Hollywood Vanity with colonial Venetian mirror, bed, chest of drawers with solid white oak inside construction, bench and rocker is built especially to stand this climate. Its a rare value at

$189.00

Two Piece Living Room Suite

This overstuffed living room suite represents the very latest in design and material in living room furniture. It has the new pillow arms and may be had upholstered either in velour or tapestry. For comfort, style or economy you will find this hard to equal anywhere at

$129.00

WE DELIVER

Any purchases amounting to $100 or over will be delivered to your home free of charge if you live within a 100 miles of Tampa.

MAIL ORDERS

If you do not find it convenient to come to Tampa send us your order by mail and we will have your furniture on the way to you 24 hours after your order reaches us.

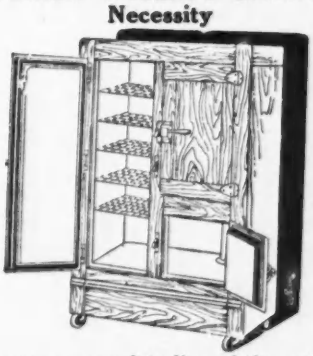
We will pay the railroad fare of one person living within 100 miles of Tampa to and from Tampa on any purchase amounting to $100 or if you prefer will have your gasoline tank filled and your car stored free when you trade with us.

Nine Piece Dining Room Suite
(Exactly As Illustrated)

This suite is artistically designed in genuine walnut and including chairs, consists of nine attractive, yet substantial pieces. It is fit to grace the home of anyone desiring high grade furniture and is unusually low priced at

$119.00

Summer Weather's Greatest Necessity



We carry a complete line of the nationally known EDDY REFRIGERATORS. These refrigerators are built especially to stand the Florida climate and are guaranteed not to warp or fall to pieces. A big buy at

$50.00

Tampa Holtsinger Furniture Co.

Tampa, Florida

500 Tampa St. **Long Distance Phone 2708**

CANNED GRAPEFRUIT TO BE ADVERTISED BY CITRUS EXCHANGE

The beginning of a new program for citrus by-products merchandising which is expected to add millions to grower profits and state income and to be a stabilizing factor in the citrus industry is announced by C. C. Commander, general manager of the Florida Citrus Exchange upon his return from New York and Washington.

Mr. Commander stated that the Exchange has arranged for the advertising of canned grapefruit juice on a national scale for the canners; in return the participating canners will take all of the Exchange cannery grade fruit up to their capacities at 90c a box f. o. b. the Exchange packing plants during this coming season. This price during the season 1931-32 will increase to 95c and for the three years following to $1.00.

PROTO RICO TURNS FROM ORANGES TO GRAPEFRUIT

Breakfast grapefruit and coffee grow side by side in Porto Rico, says a new publication of the U. S. Department of Agriculture on "Citrus Culture in Porto Rico." Although small in comparison with the California and Florida crops, the citrus production of Porto Rico in 1928 was estimated at 1,235,000 boxes of grapefruit and more than half a million of oranges.

Commercial planting of citrus in Porto Rico dates from about 1900, says the bulletin. The first planting consisted principally of orange trees but many of these were rebudded to grapefruit a few years later. The more recent plantings consist almost entirely of grapefruit. Most of the oranges grow on trees in the mountain districts, where they are used as shade for coffee trees.

Windbreaks play an important part in citrus culture in Porto Rico. Bamboo is recommended for this purpose because it grows fast. Smaller plants are grown among the citrus trees to help keep the air as humid as possible. By this means scale insects, which are very destructive to citrus trees, are kept in check by scale-destroying fungi.

Citrus growers in Porto Rico fertilize their trees much as do growers in the United States. They apply from 50 to 100 pounds of fertilizer to each tree yearly.

Extra Special Price Inducements To Growers

Like a great many other South Florida merchants we are particularly interested in increasing CASH sales. For that reason we are featuring to readers of The Citrus Industry some unusually low prices which will apply on all cash purchases made from us up to June 20th.

REMEMBER CASH MEANS ECONOMY

PHILCO RADIOS

This marvelous nationally known, universally recognized radio has no peer in the entire radio field today. Users everywhere boast of the clearness of its tone and its ability to bring in distant stations in a manner that the average radio owner seldom experiences. Savings as great as $50 may be effected on the purchase of your Philco radio from us during the period of this special offering. Prices range from

$136.50 UP

COLUMBIA PHONOGRAPHS

The reason for the remarkable increase in the volume of sales of Columbia Phonographs the world over lies in their ability to reproduce records of the human voice and of every musical instrument with absolute precision and clearness of tone. We have priced our entire stock of these splendid phonographs during this special cash discount period at savings which represent from $10 to $35 per instrument. Prices range from

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Incidentally we have the most complete line of Columbia phonograph records to be found in South Florida and at the price of 75c per record a small investment will bring you a big return in enjoyment.

Something to Appeal to the Boy

Tenor Banjos, saxophones, violins, or any other musical instrument in which he may be interested.

Portable Phonographs

Nothing can excel these little instruments for outdoor amusement—on the porch, at a picnic, or on the beach these small, compact, yet tone-perfect phonographs will bring you loads of pleasure. We have a number of used ones priced as low as $5, while new phonographs of this character are remarkably cheap during this cash offer event.

Girls Like Music Too

Ukeleles, guitars, violins. A surprisingly small investment will bring happiness to your children.

All prices featured here include delivery of your purchases to your home. If you cannot come in write us for particulars.

Gourlie Music Co.

309 ZACK ST.
TAMPA, FLORIDA

FEEDING CITRUS TREES

Continued from page 10

that crude sources of plant food must be reduced by the action of soil bacteria, and that these bacteria are at their best only where the soil is rich in humus, it is self evident that organic matter is of first importance in any grove feeding schedule. Without a live soil, teeming with beneficial nutrifying bacteria, much of the value of fertilizer is lost.

The fall fertilizer customarily consists of a 3-8-8 formula, with about one-half the ammonia derived from organic sources. This application is used very liberally and is applied early in October. Trees thus fertilized not only hold their crops well thruout the winter, but will also produce an early and vigorous flush of growth in the spring. This latter feature is particularly important in securing freedom from aphis attack on oranges. This spring the growth on our orange blocks at Babson Park was practically all matured beyond the danger point before any considerable number of aphis made their appearance.

Our fertilizer practices with bearing Valencias differ from those with grapefruit in that no fertilizer is normally used in the spring until after the crop is removed, due to the tendency of the fruit to become green and dry. Of course a certain amount of this coarsening will appear in Valencias on rough lemon stock as a result of the natural spring growth of any tree in good condition. This coarsening is retarded if no stimulating fertilizer is applied until after the fruit has been picked, which is normally in May. The formula then used is a 3-8-8 and is largely organic. Here again liberal use is made of Peruvian Guano on all trees showing a tendency to french or to exhibit a sparse or spindling growth. Trees on very thin soil which have developed dieback are also benefitted by guano or stable manure. After several years of such treatment it is rare to find a tree out of condition.

From the above emphasis placed upon the value of organic fertilizers on the Ridge soils it might appear that we have little sympathy for the present tendency to use chemical sources of plant food. While it is admitted that we cannot display the enthusiasm for chemicals that some growers do, yet we do believe they have a valuable place in boosting along heavy crops of grapefruit or Pineapple oranges. We feel that the grower who rushes headlong into a program of chemical fertilizers may be allowing his Scotch ancestry to outweigh his farsightedness because of course the chemicals do result in a considerable temporary saving. It is our belief that the grower who consistently maintains his leguminous cover crops and at the same time uses high grade organic fertilizers liberally thruout the growing season will produce a grove of vigorous trees bearing large crops of good quality fruit. This program has been followed wherever possible in our groves at Babson Park with enviable results. A number of our grapefruit groves fifteen years of age have this year produced from 500 to 600 boxes per acre, which we believe is eloquent testimony in favor of the above outlined fertilizing program.

In a test of 39 varieties of cotton at the Florida Experiment Station the best yields were made by Willis, Lightning Express, Bottom's Prolific, Miller, Cleveland 54, Coker Cleveland 88, Acala 31, and Rowden varieties.

Certain areas in the Everglades are being troubled with heavy rootknot infestation, according to M. U. Mounts, Palm Beach County agent.

In writing advertisers please mention The Citrus Industry.

Let Us Overhaul Your Motors NOW

You don't run a car until it falls to pieces before you have it fixed. You don't wait until your teeth are falling out before you consult a dentist. You don't wait until the pantry is empty before buying new supplies.

And for the same precautionary reason you can't afford to wait until the next packing season opens to find out if your motors are all in first-class running order and capable of carrying you through the season.

We are equipped to give you the most prompt and expert service in the state. We doubt if anyone else has so many emergency calls as we have. But such calls are costly.

We can bring your motors into our establishment now ond completely overhaul and clean them, checking up on any weaknesses that may exist, or if there are none, clean the motors so that they will insure you perfect satisfaction when the next season opens.

Last month we carried the names of a few satisfied patrons in our Citrus Industry advertisement, but there are so many of them that we suggest you write us for those whom we have served in your particular community.

Remember that we give day and night service the year 'round. No matter where in the state you are located a telephone call will bring an expert to you without delay.

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"Please Say You Saw It In The Citrus Industry"

New Sport for Anglers

The Angler who has fished only with the wet fly may rest assured that should he take up dry fly fishing he will discover a renewed interest in the sport of fly fishing for trout, which, perhaps through custom, may have lost something of its former appeal. Moreover, in dry fly fishing he will never consider himself much more than a beginner in the art. For the scientifically inclined angel, the man who chronically seeks to know the 'reason why' it is difficult to name any outdoor recreation which should prove more to his liking or offering more opportunities for research and study in its various branches." — From "Taking Trout With the Dry Fly."

Written essentially as a practical book, Taking Trout With the Dry Fly gives the reader briefly but completely the essence of the art as now practiced in America.

The book compares dry fly and wet fly fishing, discusses the American dry fly method and compares it with the English. It gives advice on modern dry fly rods, reels, lines, leaders, and the flies to use for various purposes, including bivisible hackles. In his chapters on casting and fishing the dry fly, Mr. Camp discusses briefly the results to be attained, and how to get them, including a fisherman's description of the natural insects of the trout stream. He also tells just where and when to use the dry fly and explains his reasons.

By Samuel G. Camp

A New Book—"TAKING TROUT WITH THE DRY FLY"

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Grove Advisory Service, Soil Investigations, Research.

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ORLANDO

Rustmites Cause Low Quality And Low Price Citrus

Russeted citrus will sell for about fifty cents to a dollar less than bright fruit. This extra loss should be charged up to Rustmites; they are one of the primary causes of unattractive and thus low quality fruit, according to J. R. Watson, entomologist with the Florida Experiment Station.

They will attack the fruit about the time oil glands develop, he said. This will mean about June before they will damage oranges, but they are probably already on grapefruit. They are more apt to be abundant in hot, dry weather. Rustmites will cause smaller fruit, that is more susceptible to diseases as well as unattractive, he explained.

It has not proven practical to do anything toward controlling rustmites until they appear on the fruit. Many growers spray or dust every few weeks through the entire season, but this is doubtless a wasteful procedure, he said.

Sulphur used either as a dust or spray is the standard rustmite remedy, and he advised the following procedure: Take a hand magnifying glass, one that will magnify about 10 times, and inspect different parts of the grove. If rustmites are present on the fruit in any considerable numbers either a lime sulphur spray or a flowers of sulphur dust should be applied. The dusting will probably be more effective if not followed by rain within three days. The lime sulphur spray will stick better, but may not give as good coverage. The chief advantage of dust, he stated, is the rapidity with which it can be put on. Ten acres can be dusted in the time ordinarily necessary to spray one; thus dusting is usually cheaper. On the other hand the grower will probably have a spray outfit for controlling scale and whitefly, in which case the small grove owner would not be justified in buying a power duster, when the work can be done with the spray machine.

A good cover crop will render the grove less liable to rustmite injury, doubtless by encouraging the growth of parasitic fungus, he concluded.

MACKLIN TO STUDY PROBLEMS OF MARKETING IN CALIFORNIA

Dr. Theodore Macklin, released to the Federal Farm Board by the University of Wisconsin, and who for the past few months has been making an economic study of marketing problems in Florida, has been transferred to California where he will make a similar study.

M. C. Ga, of the Division of Cooperative Marketing, recently taken over by the Farm Board, has been spending considerable time in Florida and will probably return in April.

In writing advertisers please mention The Citrus Industry.

Cleaner trees, quality fruit, bigger profits, if you spray your grove with VOLCK or KLEENUP, the Ortho sprays for Rust Mite, Scale, White Fly. Write for new folders.

CALIFORNIA SPRAY-CHEMICAL CO., 61 W. Jefferson Street, Orlando, Florida.

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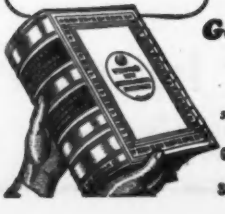

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1. Parks & Van Nest Inc.
2 Canning & preserving - Grapefruit

Grapefruit Canning

Parks & Van Nest Have Purchased Machinery and Buildings—Plant to Have 600 Case Capacity Per Day

A grapefruit canning plant of 600 case capacity per day will begin operations in Cocoa next season, it was announced by H. C. Van Nest, a member of the firm of Parks & Van Nest, Inc., buildings and machinery for the purpose having been purchased recently, says the Cocoa Tribune. The canning plant will occupy a site on the Dixie Highway south of the present packing plant of the firm of Parks & Van Nest, private fruit shippers, in the buildings formerly owned by A. C. Strode, but which were purchased by the young men recently from Mr. Strode. The transaction for the buildings was made during a visit of Mr. Strode to the community several weeks ago.

H. C. Van Nest, a member of the firm, stated that remodeling of the building to house the packing plant has been started and that machinery will arrive within the next two weeks and will be installed immediately. Canning of grapefruit will not begin until the next citrus shipping season.

Parks & Van Nest will put up grapefruit only, juice and fruit of grapefruit being canned. The plant to be installed, stated Mr. Van Nest, will adequately take care of the needs of Cocoa and Titusville and Brevard county for the present, and will provide a market for cull grapefruit for packing houses and individuals, revenue for which has been lost in the past. The purchase of off grade grapefruit will put hundreds of dollars into the pockets of growers that has been lost to them in the past.

The plant when operating at full capacity will employ from sixty to seventy people, and will afford another payroll for the city, which is needed.

HIDALGO GROWER GETS $1,000 ACRE FROM CITRUS CROP

Hidalgo county has a citrus producer who is probably the outstanding grower in the Valley. In addition to harvesting a crop that nets him in excess of $1,000 an acre he also sells budwood that will aggregate this year as much as his orchard produces.

This gentleman is W. M. Ball, who has an outstanding orchard of 12 acres. By way of contrast Mr. Ball states that his orchard here consists of 12 acres, nets him more annually than 1,200 acres in farm lands that are in the state of Minnesota. Mr. Ball gets top prices for his budwood, because he keeps a record of each and every tree. He knows what each tree does. In addition to having records of each tree, from a large number of his trees he can trace the budwood back for two or three generations. Some time back there were a small number of trees that had reached the age of four or five years old which were not producing up to his standard. He dug them out and replaced them with good stock. Some of the nurserymen who use Mr. Ball's budwood receive a difference of 25 cents or more for the trees they set out.

YEAR OLD SEEDLING ORANGE TREE BEARING ORANGE IN THIS CITY

A. Lemmert, jeweler and optician, comes in with the statement that he has two curiosities at his home in Cocoa, says the Tribune of that city. The curiosities are two year-old seedling orange trees each bearing an orange. Mr. Lemmert states that the trees are only about eight inches tall, but that this spring each put out a blossom and that an orange is coming where the blossom was.

Eight inch orange trees bearing oranges are curiosities anywhere and no doubt Lemmert's will be viewed by many growers after the news becomes spread around.

NACO Brands...STAND UP under

ADVERSE WEATHER CONDITIONS

.... they contain better ORGANIC MATERIALS

NACO Brands for Summer Citrus Fertilizing all contain liberal quantities of Genuine Peruvian Guano and this fine organic works all summer, regardless of weather conditions.

Excessive rains do not leach Genuine Peruvian Guano from the soil and over the long, hot and generally dry summer, no other material can keep the cover crop in as good condition.

In addition to Genuine Peruvian Guano, all NACO Brands recommended for Summer contain Bone Meal or Goat Manure or both . . . approximately half of the Ammonia of these mixtures is from these better Organic Materials.

NACO Brand mixtures for bearing trees contain . . . plenty of Potash. This element not only sweetens the juices of the fruit, but also tends to harden cell tissue which should hold the fruit on the trees in case of heavy winds or excessively dry weather.

Citrus Profits are largely a matter of proper fertilizers for Summer Feeding . . . NACO Brands are built to meet the needs of your trees.

NITRATE AGENCIES COMPANY

1401-1405 LYNCH BUILDING JACKSONVILLE FLORIDA

A folder describing "Peruvianite" sent free on request

Summer Courses In Sub-tropical Horticulture Available In California

A recent communication from Professor Robert W. Hodgson of the University of California calls attention to the seventh annual Summer Session in Subtropical Horticulture to be held at the Citrus Experiment Station, Riverside, June 14 to August 9, 1930 and invites attendance from Florida students. Professor Hodgson, who as head of the Division of Subtropical Horticulture of the California College of Agriculture has charge of this activity, is well known to Florida citrus growers both on account of his numerous publications on citriculture and his many trips to Florida to judge at citrus fair and shows.

Attention is called to the fact that the session has been extended from six to eight weeks with a corresponding increase in unit credits allowed for the courses. Professor Hodgson also reports that the 1929 session was by far the most largely attended and successful held to date with a total registration of 59 students representing twelve foreign countries and eight states, including Florida for the first time. He states that approximately two-thirds of the students at the 1929 session were from outside California and that nearly half of them were graduate students. The states which have contributed most largely to the student body at the Riverside Summer Session, next to California, have been Arizona Texas and Oregon. The foreign countries furnishing the largest numbers of students have been Palestine, South Africa, Iraq, Egypt, Syria, and India. Former students at the Session, totalling in excess of 200, are now scattered in practically every subtropical fruit producing region of economic importance in the world.

The outstanding feature of the courses given, which according to Proffessor Hodgson has elicited the most widespread and favorable comment, is the unusual opportunity at the Citrus Experiment Station, and taken advantage of by the instructors, to combine theory and practice. The mornings are devoted to lectures, the afternoons to laboratory exercises, mostly in the field, and the Saturdays to field excursions which cover the greater part of the intensively developed subtropical fruit areas of Southern California.

The courses offered in the coming session will be citriculture and viticulture, 5 units each, and subtropical fruit insects and subtropical fruit diseases, 3 units each. The opportunity to do special work is also afforded to properly prepared students. The faculty will include some of the best known citrus specialists in the world among them are Dr. H. J. Webber, Dr. H. S. Fawcett, Professor H. J. Quayle and Professor Hodgson.

Students may enroll as regulars, taking the work for credit, or may attend as auditors. In order to insure acceptance early registration is advised as the facilities are limited and the accommodations will provide for only approximately 60 students. Persons interested in attending the Riverside Summer Session are asked to communicate with Professor Hodgson at 339 Hilgard Hall, Berkeley, California.

Over $1,000 worth of poultry was sold cooperatively on two recent visits of a poultry car to Crestview, Miss Bertha Henry, home demonstration agent, reported.

In writing advertisers please mention The Citrus Industry.

The Season Ahead and

BROGDEX

Comparative prices in the various terminal markets covering the entire season just closed show that Brogdex treated fruit brought above the market average right along. In the New York auctions buyers paid an average of 37c a box more for Brogdexed oranges in November than they did for the untreated fruit; in December the premium was 65c a box; January 53c a box; February 21c a box; March 25c a box—an average of 40c a box for the entire season.

Brogdex shippers selling to private trade state that their average premium above the market was even more impressive than those shown in the auction reports.

These better prices can be explained in no other way than that Brogdex helps the fruit keep better and makes it look better. No claim is made that the inside of the fruit is improved but it sure does doll up the outside and that is where it counts most.

Contracts so far signed and definite promises made indicate that more than 6 million boxes will be Brogdexed the coming season. The common benefit which Brogdex brings to all parties concerned has been publicly admitted in the press during the past few weeks by some of the largest citrus interests.

The growing market preference for Brogdexed fruit has impressed our shippers with the importance of delivering fruit that will keep better and look better. A few years ago this did not make so much difference but now the market is pretty well informed and some of the large houses are predicting that it won't be long now until every box of Florida fruit is Brogdexed.

Where volume justifies we furnish, install and maintain the machinery necessary to properly Brogdex your fruit; furnish borax and wax, labels and stamps for advertising that the fruit has been Brogdexed, all without cost to you. When you begin packing then you pay us a service charge of 6c a box for all fruit Brogdexed.

Without obligation may we discuss the matter with you?

Florida Brogdex Distributors, Inc.

B. C. SKINNER, President DUNEDIN, FLORIDA

Tune in on WFLA Clearwater every Monday night at 7:30 for our Brogdex Program

"Please Say You Saw It In The Citrus Industry"

Experiment Station to Study Refrigeration

Refrigeration studies, badly needed, are to be undertaken in the near future by the Florida Experiment Station. The State Board of Control, at its April meeting, approved plans for the erection of a series of refrigeration rooms on the grounds of the Experiment Station at Gainesville, to cost around $16,000.

Plans for the rooms were drawn by Dr. A. F. Camp, horticulturist of the Experiment Station, in consultation with refrigeration experts. Dr. Camp has the following to say about the importance of the work and some of the lines to be investigated:

"I do not believe that there is any line of work of greater importance in the state at present. With the citrus crops becoming steadily larger, the necessity for expanding the present shipping season from seven to 10 or 12 months is of the utmost importance and can be accomplished only through the refrigeration of fruit, the freezing of juices and pulp and the canning of grapefruit pulp under the present conditions. The information available on the refrigeration of citrus is scanty and, for the most part, inaccurate. The work on frozen juices and pulps has been only begun, but thousands of dollars have already be lost in the state by commercial companies in their attempts to develop this line.

"Some of the following problems might be mentioned as typical of those now forcing the horticultural industries of Florida along the lines of refrigeration:

"1. Freezing points of oranges, grapefruit and other citrus fruits; utilizing various species and varieties and determining accurately freezing points throughout the season, and their relation to weather and other conditions.

"2. The effect of temperature and humidity upon the holding oranges, grapefruit and tangerines.

"3. The effect of various types of wrappers and surface treatments on the holding quality of citrus fruits at various temperatures.

"4. The length of time necesasry to chill citrus fruit in pre-cooling under various conditions of temperature, wrappers, boxing, etc.

"5. Factors influencing pitting of grapefruit under cold storage conditions.

"6. The effect of various methods of extracting and freezing on the quality of orange juice.

"7. The effect of various types of containers on the holding quality of frozen orange juice.

"8. Studies on the freezing of grapefruit and orange pulp to determine the effects of various methods of handling on the keeping quality, and also the suitability of various types of containers.

"9. Studies on the keeping qualities of avocados and the determination of the critical point for various strains and varieties.

"10. Studies on the ripening of green picked tomatoes at various temperatures.

"11. Completion of studies on effect of temperature and humidity on boll weevil hibernation"

In addition to investigators from the horticultural department of the Experiment Station, graduate students in the Collegt of Agriculture will be used in running the tests.

Hernando County women have made 29 work shirts for their husbands, out of bleached feed sacks, during the last few weeks, Mrs. Florence Albert, home demonstration agent, stated.

GRAPE FRUIT HEARTS

(REG. U. S. PAT. OFF.)

Is the registered trademark for our fancy pack of canned grapefruit.

Anyone using the word **"HEARTS"** in connection with canned grapefruit is infringing on our registered trademark and will be held liable to the full extent of the law.

Spanish American Fruit Co., Inc.

Singer Building, New York City

Pioneer canners of grapefruit in Porto Rico since 1920

Shipped Fruit F. O. B. Arcadia

Selling citrus fruit f. o. b. shipping point is the ideal way of handling it in the opinion of E. R. Jones, and during the past season he very effectively demonstrated that it can be done. He shipped twelve cars of mixed fruit from Arcadia, mostly from his own groves, and the price in each instance was fixed f. o. b. the cars in Arcadia.

Mr. Jones, who with Mrs. Jones left last Friday to spend the summer at Frankfort, Kentucky, gave an Arcadian representative a brief story of his experience in selling fruit the past season.

In the first place, to sell fruit in this way it is necessary to have a complete understanding with the distributor in regard to quality and other essential details, and it is also necessary that the buyer have implicit confidence in the integrity and ability of the seller. Given these, however, Mr. Jones proved that it was possible to sell fruit for cash at the shipping point.

Oranges Averaged $3.22 Per Box

In this lot of twelve cars there was included 2,571 boxes of seedling oranges, for which he received an average of $3.22 per box, although more than 75 per cent of them were No. 2 fruit. Those who are conversant with the prices prevailing this season will realize that this is a very good average return.

As a further evidence of perfect understanding with the buyer, Mr. Jones states that in every instance the invoice price was the final price, as the entire twelve cars were handled without an adjustment being necessary after the car was sold and billed out. This indicates that there was in each instance a distinct understanding as to what was ordered, and the order was followed with scrupulous integrity.

Mr. Jones is convinced that if there was more effort made to sell fruit on f. o. b. terms the relations between buyer and seller would be much more satisfactory, and the results to the grower would be eminently so.

SOIL CONDITIONS AND CITRUS TREE RESPONSES

Continued from page 9

increased in acidity, due partly to the low nitrifying power of such soils. Hendricksen increased the acidity of a Porto Rico soil over ten times in three months by the use of sulphate of ammonia as a fertilizer. It may be that the reaction of the soil is of lit-

DANGER!

The present situation demands that all growers constitute themselves a committee of one to see that their groves are cleaned of all drops and scattered fruit that may be left on the trees.

In this way only can you reduce the hazard of additional infestations of the Mediterranean fly this summer; so let's

CLEAN UP!

Use your influence with your neighbor to see that he does likewise. Remember that additional infestations this summer will, no doubt, result in more stringent quarantine regulations next year.

LYONS FERTILIZER CO.

Tampa Florida

LYONS FERTILIZER CO. ORANGE BELT BRANDS TAMPA FLORIDA

OFFICE
805 Citrus Exch. Bldg.

PLANT
35th St. and 4th Ave

"QUALITY FERTILIZER FOR QUALITY FRUIT"

tle importance when it is unable to hold residues because of its coarse texture, but there are examples to prove that the better grade of citrus soils and change in reaction so markedly in five years that regular heavy production of fruit is impossible. Leaving the question of organic matter, which is highly important, to the other papers, I wish to call your attention to my belief that while the citrus tree may grow on a wide range of soils, heavy consistent production of fruit is possible only within a narrow range, somewhere about the neutral point. There are other plants of which this true. The tomato will grow on soils of a wide range of reaction, but heavy fruiting is only possible at a reaction of about pH6.4. Similar facts will some time be available concerning the citrus tree. At the present time there is sufficient evidence to justify the grower in trying to keep his soil as full of organic matter as possible with a reaction between pH6 and pH7.

10-ACRE CITRUS GROVE YIELDS $12,414 NET

R. S. Caudle of Lakeland reports a net yield of $12,414.00 from the season's crop on his 10-acre grove in the highlands. The grove has 438 grapefruit trees, 16 Valencias, and 25 young tangerines. The grapefruit trees are 18 years old.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of August 24, 1912, of The Citrus Industry, Published Monthly at Tampa, Florida, for April 1, 1930

State of Florida,
County of Hillsborough.

Before me, a Notary Public, in and for the state and county aforesaid, personally appeared S. L. Frisbie, who, having been duly sworn according to law deposes and says that he is the editor of The Citrus Industry, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse side of this form, towit:

1—That the names and addresses of the publisher, editor, managing editor and business manager are:

Editor, S. L. Frisbie, Tampa, Fla.

Business Manager, S. L. Frisbie, Tampa, Fla.

2—That the owners are:

Associated Publications Corporation, Tampa, Fla.

S. L. Frisbie, Tampa, Fla.
S. Lloyd Frisbie, Tampa, Fla.
B. L. Gable, Tampa, Fla.
F. L. Skelly, Orlando, Fla.
Frank Kay Anderson, Altamonte Springs, Fla.
B. W. Skinner, Dunedin, Fla.
F. P. Wall, Mansfield, Ohio.

3—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are:

Bankers Mortgage Co., Orlando, Fla.

Sworn to and subscribed before me this 11th day of April, 1930.

W. F. REEDER,
Notary Public.

Penny-Wise
is Dollar-Foolish
with
CITRUS TREES

RIGHT NOW is the time to make sure of this year's citrus crops. Don't let them go hungry during the summer. Before the rains arrive, give them some more food. But don't make the big mistake of scrimping. That may save a little on the per acre cost of the crop—but you lose a lot in the final per acre profit later on.

No need to gamble. Give your citrus trees a good application of Chilean Nitrate of Soda—about 30% of the year's total supply. It's the plant food they need to carry them through to a good yield. Chilean Nitrate is the only *natural* nitrate in the world. Its quick-acting nitrogen goes right to work. Trees become healthy—more vigorous. Fruit is larger, matures early and ships better. Higher sugar content, too. That means top market prices.

If you possibly can, arrange to see the remarkable long-time nitrogen experiments at Lake Alfred Experiment Station. You'll find the time well spent.

Free Fertilizer Book

A new book, "How to Fertilize Citrus in Florida," tells how you can make citrus trees pay greater profits. Ask for Book No. 7, or tear out this ad and mail with your name and address.

1830-1930—This year marks the 100th anniversary of the first cargo of Chilean Nitrate brought to the United States.

Chilean
Nitrate of Soda
EDUCATIONAL BUREAU

Orlando Bank & Trust Bldg., Orlando, Florida

In writing please refer to Ad No. 25-K

SOME NEW OR LITTLE KNOWN CITRUS DISEASES OBSERVED DURING THE PAST YEAR

Continued from page 7

hard, brownish rind inclusions. Although the pulp of the fruits exhibiting the lumpy rind condition is not affected, the hard, and often lumpy, condition of the rind impairs the market value of such fruits.

The lumpy rind condition in question is distinct from that due to injury of the fruit by mealy bugs or aphids and may occur on fruits which also exhibit these insect injuries. This rind abnormality appears to be the result of an abnormal growth condition rather than of any injury. The trouble has been known to occur in the state for several years but appeared to be of exceptionally widespread occurrence during the season of 1929-30, occurring abundantly even in groves that were well cared for.

But little is known concerning the conditions with which the development of lumpy rind is associated. This trouble is considered by some growers to be a manifestation of exanthema (dieback) but occurs commonly in the absence of the usual symptoms of the latter trouble. In fact, the occurrence of lumpy rind is frequently associated with trees on rough lemon stock that have lapsed into a chronic decline and exhibit more or less dead roots following overbearing in conjunction with other devitalizing influences, in which case it develops most abundantly on the abnormally small fruits commonly produced on such trees. Lumpy rind likewise has been observed to occur on trees that have developed a chronic mottle-leaf condition and deranged growth following liming several years ago. It has also been observed on trees that have developed the chronic wilt and decline known as "blight". The trouble appears to develop much more readily in the case of trees on rough lemon than in those on sour orange stock.

The speaker's observations indicate that both new problems and new angles on old problems in citrus diseases continue to arise from time to time and call for an increasing amount of study.

SUMMER FERTILIZERS SHOULD BE GIVEN TO CITRUS GROVES SOON

This is about the time for summer fertilization of citrus groves, according to Dr. R. W. Ruprecht, chemist at the Florida Experiment Station, who recently discussed the subject in a radio address over WRUF.

He showed from tests at the citrus sub-station at Lake Alfred that such inorganic salts of nitrogen as sodium nitrate and ammonium sulphate have given best results. Due to heavy rains this season he suggested the use of a complete fertilizer containing about 4 percent ammonia.

He advised planting a good cover crop immediately if one had not already been planted.

CLASSIFIED Advertisments

The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

REAL ESTATE

FOR SALE—By owner, eighty acres, two-year-old best looking grove at reasonable price. Howey-in-the-Hills. For further information write "A. Z." P. O. Box 1261, Orlando, Florida.

FOR SALE—Pineapple land in winterless Florida. $15 an acre. Almont Ake. Venus, Fla.

WANT TO SELL HALF INTEREST IN FIFTEEN ACRE SATSUMA BEARING GROVE ON HIGHWAY NEAR PANAMA CITY. ROBT. LAMBERT, OWNER. FOUNTAIN, FLA.

SATSUMA BUDWOOD from Bearing Trees. Hills Fruit Farm, Panama City, Fla.

WANTED—To hear from owner having good farm for sale. Cash price, particulars. John Black, Chippewa Falls, Wisconsin.

MISCELLANEOUS

RAISE PIGEONS—Profit and pleasure. Illustrated descriptive catalogue postage six cents. Vrana Farms, Box 314a, Clayton, Missouri.

TUNG OIL TREES—Cluster variety. Vigorous. Forty cents each. Lots of hundred 30 cents each. Hunt Bros., Inc., Lake Wales, Fla.

FOR SALE: Splendid bearing citrus grove in Lee County, far removed from Fruit Fly infestation. Will produce 20,000 boxes coming season. If you want this grove address P. O. Box 295, Fort Myers, Fla.

ORANGE PACKERS ATTENTION: — Two chemical transparent flexible orange coating processes for sale; royalty or license basis. Patent pending. Dr. C. V. Berry, 251 West 111th Street, New York City.

PUREBRED PULLETS FOR SALE—White Leghorns and Anconas ready to ship Barred Rocks and R. I. Reds shortly. Several hundred yearling White Leghorn hens now laying 70%. Write or wire for prices. C. A. Norman, Dr. 1440, Knoxville, Tenn.

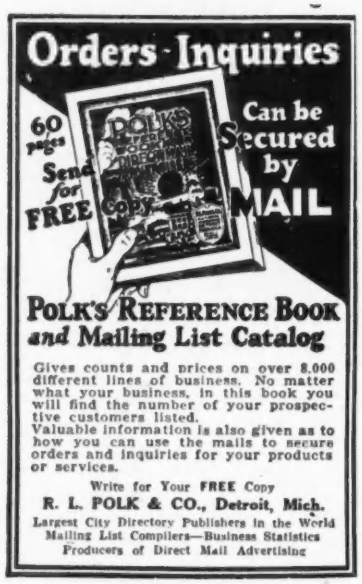
HIGH BLOOD PRESSURE easily, inexpensively overcome, without drugs. Send address. Dr. J. B. Stokes, Mohawk, Fla.

LAREDO SOY BEANS, considered free from nematode, excellent for hay and soil improvement. Write the Baldwin County Seed Growers Association, Loxley, Alabama, for prices.

AVOCADOS - SEED — Grafted. Reliable bearers only. John B.Beach, West Palm Beach, Florida.

WANTED—To hear from owner of land for sale. O. Hawley, Baldwin, Wis.

FOR SALE OR TRADE—Good horse, single wagon and two sets harness. J. P. Lynch, Groveland, Fla.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